The Iron Age

A Review of the Hardware, Iron and Metal Trades.

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The Taylor Ore Roasting Kiln.

While important improvements have been made during the past few years in almost every department of iron manufacture, yet it is acknowledged by all iron masters that one of its most important branches, viz., the calcination or roasting of iron ores for the elimination of sulphur and the preparation of ore for smelting, seems to have been neglected. It is a well-known fact that the bulk of all the ores low in phosphorus in this country, mainly magnetites, are rich in sulphur, silicious, dense, refractory, and can only be used in their native state in limited quantities, mixed with other ores, for the production of higher grades of metal. Being largely interested in these ores, and recognizing the importance of their more extensive utilization, and believing that good calcination was practicable, W. J. Taylor, of W. J. Taylor & Co., proprietors of the Chester Furnace, Chester, N. J., began experimenting in this direction in 1875. A review of what had already been done in this direction furnished nothing that could be taken as a starting point. In this country a few spasmodic efforts had been made to roast ore, by mixing with it small coal or braze, in what might be called lime kilns of various kinds, but all with the same result. Irregular heating, and consequent clinkering, took place as soon as a temperature was attempted high enough to accomplish anything like a rapid and comparatively complete oxidation of the sulphur and opening of the ore. Even had this not been the case, this plan must necessarily have proved a failure, because it is impossible, in furnaces so constructed, to introduce and control the requisite amount of air necessary for complete oxidation, and at the same time maintain and control the temperature of the ore.

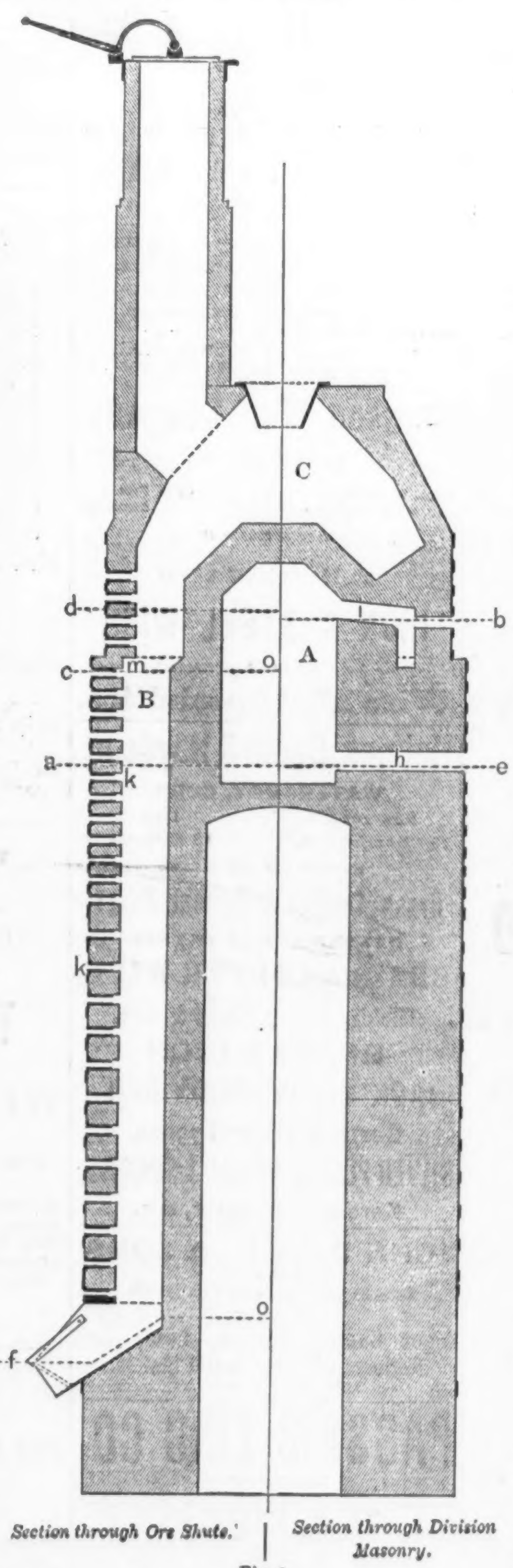
The extensive roasting of the Cleveland carbonates in England was no guide, as neither high temperature nor an oxidizing atmosphere is necessary to expel carbonic acid, and any lime burner could roast this ore in any ordinary lime kiln. The only kiln approaching in result what Mr. Taylor desired to accomplish was the Westman Gas Kiln, extensively used in Sweden for the purpose not only of desulphurizing the hard magnetites of that country, but also for roasting all other magnetic ores, making them open and porous. But as this kiln necessitated an excessive amount of labor and gas from the blast furnace, little encouragement was found in that quarter. Some six or eight months spent in building, altering and experimenting with the lime-kiln process of solid fuel having convinced him that a complete roasting in that way was practically out of the question, his attention was turned to a gas kiln. An enumeration of the many different kinds of kilns experimented with is not necessary, but the result of all may be seen in the accompanying sketch of this kiln, now running successfully at Chester, N. J., roasting sulphurous New Jersey magnetites, and can be seen at any time by those interested in the business. Fig. 1 represents a vertical central section through a 6-shute kiln; the left hand half showing a section through a shute or ore chamber, and the right hand half through the solid portion or division between the ore chambers.

Horizontal sections through different parts of the kiln are shown in Fig. 2. The essential features in the operation of this kiln are that the ore is heated to a high temperature as soon as possible after entering the kiln, and is then dropped out of the hot gases of combustion and oxidized in its passage down the ore chambers, where atmospheric air only is in contact with it.

The shape of this kiln, as may be noticed, enables this to be done. A is the combustion chamber, closed at the top and surrounded by the heating and oxidizing ore chambers B, and surmounted by a common ore supply chamber, C. Gas and air are introduced at the bottom of the combustion chamber through the flue *h*, and after combustion escape near the top through flues *l*, put in for this purpose. These flues are connected directly with the triangular circulating flues *m* of the outer periphery of the ore chambers, made by the offset inward of the outer wall of the ore chambers and the slope of the ore. Hence the whole outer face of the ore at this point in the ore chamber is exposed for the entrance of the hot gases of combustion, and as soon as the ore attains the proper temperature, say a welding heat, cold ore is drawn from the shute below and all the ore in the ore chamber moves downward, thus dropping the hot ore below the hot gases, while cold or partially heated ore from above takes its place. The cold ore is drawn from the shutes below at intervals to suit the heating above. Consequently, all the ore in the chamber is moved downward a little every few minutes, which keeps it from clinkering seriously and facilitates oxidation.

The ore in its passage downward in the ore chamber is cooled by the air admitted for oxidation, while the heat extracted passes upward, supporting the temperature at the heating zone or circulating flue. The ore is a long time in losing its high temperature. The ore chambers are provided with punching holes, K, which at the same time answer for sight holes and for the admission of air. The great difficulty has been to arrange the outside of these chambers for access with punching bars. At first a series of arches one above another were used, closed on the outside horizontally to about the width of a brick. These arches formed too much obstruction to the downward passage of the ore when any clinkers were formed. But this difficulty has been entirely overcome by what may be called the triangular or three-sided ore chamber with the punching and sight holes, as shown in plan designed by Mr. Taylor's able assistant, Mr. N. M. Langdin, who has been in direct charge of this work from the beginning. The principal and most important advantages claimed for this roasting and oxidizing kiln are: 1. Complete control of the temperature, gaseous fuel only being used, although no objection has been found, but, on the contrary, perhaps a little advantage at times, to the introduction of a very small quantity of coal dust mixed with the ore. 2. Uniform heating of the ore to any temperature required at the point desired. 3. Entire control of the ore, after it is heated, in an oxidizing atmosphere. 4. Economy of working, as no heat need be lost or extracted with the ore. 5. Economy of construction, a 50-ton kiln costing about $1500 only, with a minimum cost in wear and tear. 6. Rapidity of working, the capacity of a kiln of, say, 16 feet outside diameter, divided into, say, seven shutes, being about 50 tons of ore per day. For driving a kiln at this rate—four men per shift and the gas—about 75 pounds anthracite coal per ton of ore are required. The ore used is broken down to go through, say, a 4-inch ring, and no fine ore of any amount goes in, as a kiln will not drive if much fine ore is used. The ores that have been hitherto roasted contained from two to four per cent of sulphur, which has been readily reduced to one-half and three-quarters per cent.

The roasted ore works very easily in the blast furnace, and experience has taught that, if not too lean, iron can be made with one and a quarter tons of coal. These kilns can also be used to great advantage for many other purposes than the expulsion of sulphur from iron ore. We may add that Messrs. J. W. Taylor & Co. will build a pair of these patented kilns at once at Andover, Sussex County, New Jersey, to roast the ore from their Big Hill vein, mined at that place.



Section through Ore Shute. *Section through Division Masonry.*

Fig. 1.

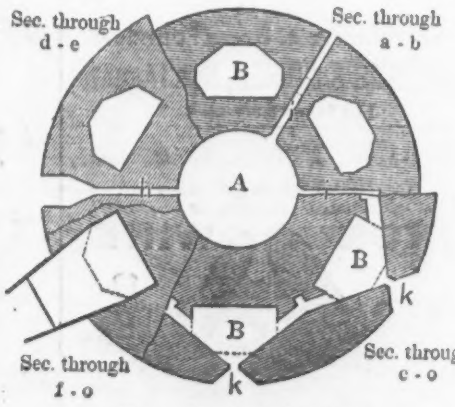


Fig. 2.—Horizontal Section.

THE TAYLOR ORE ROASTING KILN.

Technical Schools for Art Work.

The prospectus of the technical schools of the Metropolitan Museum of Art, in this city, has been issued. These schools are under the direct supervision of the trustees of the Museum, of which Gen. Di Cesnola is director. They will occupy the building erected for the purpose in First avenue, between Sixty-seventh and Sixty-eighth streets. It is the purpose of these schools to make thorough, efficient and practical mechanics in the two branches of carving and painting; also to supply a course of lessons in modeling and drawing, both by day and night, for the benefit of those who have not been able to finish their artistic education. The full course will last from December 6 to May 1, or about five months. The special courses will average about five weeks. No student under 14 will be admitted to the technical classes, and the applicant must have had some previous knowledge of drawing. No student under 17 will be admitted to the practical classes.

Trades will be taught practically by workmen obtained expressly from shops well known for their excellence; and the artistic branches by various teachers, each in his own specialty. The value of the technical education in foreign schools is evident in the prices commanded in the trades by workmen who have had these advantages. It is proposed to furnish the facilities not hitherto attainable in this country, for a combined artistic and practical experience in the branches taught. It is intended that the student shall be not only a master of his tools, but able to distinguish good from faulty work, either mechanically or artistically. At the end of the term each student in a full course considered competent will receive a diploma.

All information in regard to these schools can be obtained by applying at the school building between 9 and 10 a. m., or by letter to John Buckingham, manager.

The track of the Syracuse and Binghamton Railroad runs through Tallman Swamp, a mile outh of Preble. A new track was laid recently west of the old one, and a few days ago a gravel train was run there for filling in and making embankments. At noon the train hands left the work train standing on the west track. As they were returning they saw the west track and the train sinking out of sight in the morass. The ground seemed to be heaving under a subterranean force. In less than a minute six of the gravel dumps were buried out of sight, and a pond of water near the track disappeared. It is supposed that the weight of the train was too great for the framework of decayed logs and vegetable accumulations underneath.

The English Agricultural Returns and American Competition.

The English agricultural returns for 1880, which were issued about three weeks ago, show very clearly the effect of American competition upon English farmers, as well as the means which they are using to adapt themselves to the situation. It is at first a little surprising to find it stated that at a time of serious agricultural depression the cultivated acres have increased by 126,000, or to a total of 47,587,000 acres; but as this total includes an increase of "bare fallow" acres from 721,000 acres to 812,000 acres, and as the returns are yearly more accurate and comprehensive, there is only a slight margin left to represent a total reclamation from mountain, moor and bog. The area under wheat is 2,909,000 acres, as against 35,500,000 in this country. This is an increase of 19,000 acres over 1879, but that year's record was the lowest since 1867. In oats, also, there was an increase of 5 per cent., to 2,797,000 acres, as against some 13,000,000 acres in this country. But there was such a decrease in barley, and especially in Indian corn, or maize, that the total corn crop acreage is only 8,876,000 acres, a decrease of 1 per cent. since 1879, and of 7 per cent. since 1870. Being thus partially driven from the grain fields, the British farmers have increased their green crop acreage by 10,000 to 551,000 acres, and there is also an increase in orchards and market gardens. The nature of the product, which limits the demand, and a climate too uncertain for large scale fruit-growing must, however, make any changes in this direction of small importance compared with the total farming interest. There is, however, a very large increase of permanent grass land. Since 1870 this increase is no less than 2,500,000 acres, since last year it is 260,000 acres, and the total of pasture land is now 14,427,000 acres, or nearly 45 per cent. of the arable land of Great Britian. Here is a tendency too well marked to be overlooked. The farmers see the need of going from grain to grass, and are trying to take the step, but that many of them think the always tedious process is also of doubtful profit, is a fair inference from the large number of acres lying idle under fallow. As might be expected from the large area of grass, there is an increase of 2 per cent. in horned cattle since 1879, and they now number 5,912,000. There is a decrease since last year of 1,500,000 sheep and lambs, but that is said to be due to disease induced by bad weather, and is, therefore, merely temporary. They now number 26,619,000. The decline in pigs—91,000 since 1879 and 483,000 since 1878—is a more serious matter, since it is traced to the competition of American bacon, and may, therefore, be set down as permanent. Figures are also given as to the size of holdings, which show some changes since 1875, when the return was last previously taken. In all Great Britain, the report says, the area held in occupations of 50 acres and under is still 15 per cent. of the total; that between 50 and 100 acres also 15 per cent.; between 100 and 300, 42 per cent; from 300 to 500, 16 per cent.; from 500 to 1000, 10 per cent., and in farms over 1000 acres, 2 per cent. In England alone a tendency to larger occupations may be noticed, the small farms of 50 acres and under being now 14 instead of 15 per cent. of the whole acreage, and the moderate-sized ones, between 50 and 300 acres, 54 per cent., against 56 per cent. in 1875, while farms over 300 acres amount to 32 per cent., or nearly a third of the cultivated area, as compared with 29 per cent. in 1875.

The Paterson (N. J.) *Press* publishes the following letter received from Mr. E. Fontaine, the inventor of the friction-driver locomotive, lately completed at the Grant Works: The engine arrived here Sunday night, Oct. 31, all right. On Wednesday last we fired her up and ran her out in the yard empty. On Thursday we pulled a few cars through the yard. On Friday we took 24 heavily loaded cars, and pushed them down about 2 miles, and pulled them back up a 25-foot grade at the rate of 25 miles an hour. Saturday it stormed and did not take her out. Monday morning Mr. Boon (superintendent of the Fort Wayne Railroad) returned, having been absent the week previous, and knew nothing of what had been done, and when told what she had done, could hardly credit it. We then took on 21 cars, several of them doubly loaded, weighing 474 tons and 200 pounds gross weight, and pulled them up the same grade, as above mentioned, with perfect ease. We then took on 7 more loaded cars, pulling up same grade as before; then took on 5 more with the same result, again 6 more, making 39 loaded cars, weighing 862 tons and 650 pounds gross weight, which she pulled over the same grade, and proved the extent of her ability to handle; all this was done with 135 to 140 pounds of steam. Mr. Boon and all who witnessed the trial were greatly astonished, and none more so than myself. Have made no attempt to test her speed, and will not for the present. But have no fears on that score, as no one doubts her ability to make speed.

London Bridges.

It will be a surprise to most people, remarks the *Echo*, to learn that, after paying £1,373,325 to free the toll bridges over the Thames, the Metropolitan Board of Works find the bridges in such a condition as to require the expenditure of £640,000 to make them safe. Yet this is what transpired at the meeting of the board last Friday. It is no answer to the cry of disappointment that is certain to arise to say that the expenditure will be spread over a number of years. It will have to be borne by the ratepayers, whether it is one year or twenty. Sir Joseph Bazalgette, the engineer, has presented an elaborate report, in which he describes the condition of the nine bridges (excluding that at Deptford) which demand the enormous expenditure we have named. Two of them—namely, Battersea and Putney—will have to be rebuilt, the former at a cost of £250,000, and the latter, with the approaches, costing £300,000. The case of Waterloo Bridge is the most curious. Soundings which have been made of the bed of the Thames since 1823, when the celebrated architect of the Menai Suspension Bridge, Telford, took the soundings, have established that the scour is continually deepening the bed of the river. Waterloo Bridge was built in 1814, upon a timber staging resting upon piles 20 feet long, and the masonry was carried to a depth of 5 feet below the bed of the river. The result of the scour has been that the heads of these piles are now from 1 foot to 6 feet above the bed of the river, and are visible at low water. If the foundation between the piles should be washed out, the structure would inevitably sink. The engineer now proposes to put wrought-iron cylinders round each pier, and to fill up to the level of the foundations, so as to make a solid foundation right down to the piles. These works are estimated to cost £40,000, and they were ordered on Friday by the Board. Vauxhall bridge is in pretty much the same condition, and here it is proposed to convert the three central arches into one opening, and to dredge out, so as to get an adequate area of waterway, besides putting down similar caisons to those recommended for Waterloo; estimated cost £45,000. The Lambeth Bridge is decaying; from 5 feet of the cable 9 lbs. weight of rust has been removed, of which about 42 per cent. was pure iron. The Albert Suspension Bridge, "if loaded on one side, will depress where loaded, and rise where not loaded." A part of Battersea Bridge overhangs as much as 9 feet, and the stumps of the piles are in a ruinous condition. Wandsworth Bridge has suffered from want of cleaning and painting. Putney Bridge, which is 151 years old, is in little better condition than Battersea, and is a serious obstruction to the navigation. Of Hammersmith Bridge it is remarked that it will become a matter for serious consideration whether wrought-iron should not be substituted for the cast-iron cross-girders under the roadway. The Board have resolved to seek Parliamentary powers for such portions of the foregoing projects as they have not power at the present to carry out, and for mending this bad bargain of the Board the ratepayers will have to pay what will be equal to a single rate of 6½d. in the pound.

Building Societies.—Foreigners are always amazed, says an English exchange, at the large sums of money which appear in government reports and represent the business of that country. A return like that relating to building societies, could not be matched probably in Europe or America. There are in England and Wales 946 societies, containing 320,076 members, or an average in each society of 330. The total amount of all shares is £18,864,148, or about £59 per member; and the depositors and creditors have invested £11,458,438. The year's receipts were £16,417,122. The balance due on mortgage securities is £29,842,576. Last year could not be said to be prosperous, but no less than 155 new societies were incorporated in England. In Scotland there were 11,902 members of building societies. The liabilities to shareholders amounted to £809,124, and to depositors to £500,044. The balance due on mortgage securities was £1,163,818, and other investments were of the value of £107,003. In Ireland there were 6533 members of building societies. The liabilities to shareholders were £500,417 and to depositors £346,427. The balance due on mortgage securities was £855,932, and the value of other investments was £43,915,

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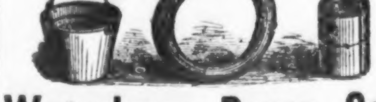

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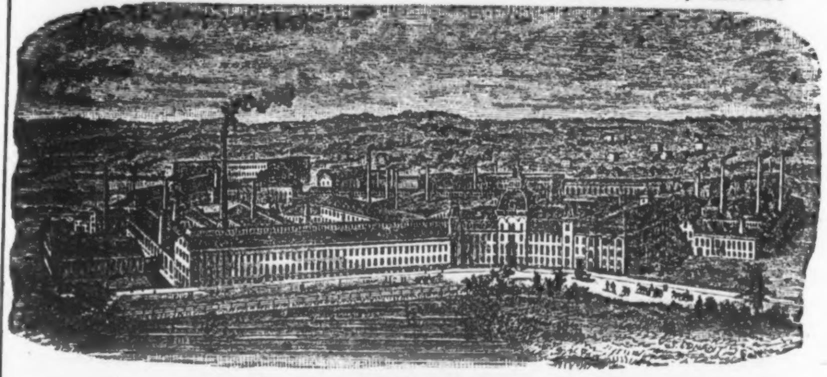

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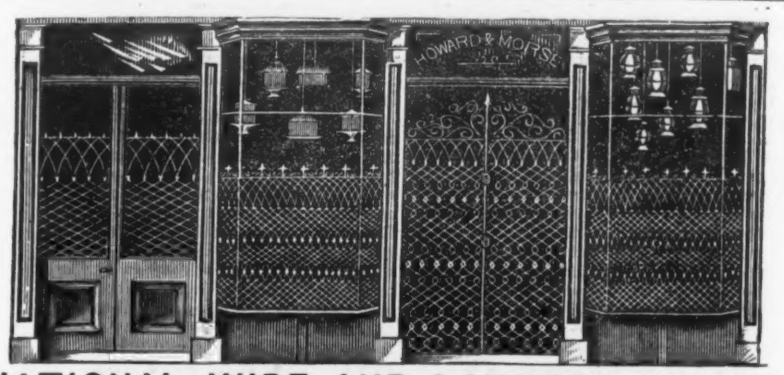

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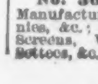

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Papers on Practical Founding.—X.

BY EDWARD KIRK.

MOLDING FLOORS.

After erecting the right kind of a building for stove founding, the next important thing to be done is to put in the molding floor. This cannot be made of wood, for it would take fire if any molten iron were spilled or any hot castings laid upon it. Moreover, the sand would dry very rapidly on a wooden floor, and the dampness of the sand would soon rot the floor. For these reasons some earthy material that will harden and resist the action of heat is used for foundry floors. The floor should be made in such a way that it will not become wet and muddy by water leaking in from the adjoining grounds during wet weather, for, if the foundry floor is too wet the sand draws dampness from it and soon becomes so wet that it cannot be used for molding. Besides, if molten iron be spilled upon a wet floor it explodes like gunpowder and is very dangerous to the workmen. To avoid these troubles the floor should be raised above the level of the adjoining ground. The earth should be removed from the foundry to the depth of a foot or more below the intended top of the floor, and this space should be filled in with cinder to the depth of 8 or 10 inches. If the ground is very wet a drain should be connected with this cinder bed, so as to carry off any water that may leak into it. On top of this bed of cinders the floor should be made of some substance that will harden or pack so solid that it will not be dug up by the shovel when the molding sand is tempered or shoveled.

Many different materials have been tried, all of which have their advantages and disadvantages, but the material most extensively used for floors is common yellow clay. The clay is well puddled and worked, to unite the different strata and make it tough; it is spread over the bed of cinders to the depth of from 4 to 6 inches, and is well rammed, to pack it down solid; it is then scraped off perfectly level and allowed to dry for a week or two before it is used. This material makes a good molding floor, if the right kind of clay is used and the floor is properly rammed and dried, and it keeps the sand heaps in better temper than a floor made of any other material. The only objection to the clay floor is that it draws dampness from the sand heaps and gets a little soft under them. A careless molder will soon dig holes in the floor under his heap when he is molding up or tempering the sand. These holes, however, can easily be repaired, and in many of our leading stove foundries clay is the only material used for molding floors.

Many of our large stove founders have attempted to find something that will make a more durable molding floor than clay, and they have tried various materials. Cement has been largely used. It makes a fine smooth floor to work on, but is not nearly so durable as clay, as it is affected by heat. When molten iron is spilled upon the floor it cuts up the cement, and holes are made that are difficult to repair. The cement breaks up around the edges, the hole enlarges very fast, and small hard pieces of cement get into the molding sand and often spoil the castings. Cement floors, moreover, draw the moisture from the molding sand very rapidly, making it difficult to keep the heaps in proper temper. They have, therefore, been abandoned in foundries where they have been thoroughly tested. Brick and cement are sometimes used for making floors. The foundry is filled in with cinders or ashes to the proper hight, and is paved with bricks laid from ¼ to ½-inch apart. These are then slushed with cement, which is mixed with water and made very thin, so that it will run down between the bricks, cementing them into one solid sheet. This makes a harder and more durable floor than any that has been used, and the only objection to it is that it is very hard on shovels, wearing them very rapidly. Several other materials have been used for floors, but for durability and cheapness none make a superior floor to the clay or the brick and cement floor.

In stove founding a good level molding floor is as important a matter as a good pattern. Some of the plates are so thin that the molten iron must be poured very rapidly to prevent its being chilled by the damp sand before it has filled the mold or formed the casting. For this purpose flat gates are often used upon the casting. They weigh twice as much as the latter, and when filled with molten iron, exert an immense downward pressure. If a flask is 2 or 3 inches lower at one end than at the other, all the pressure of the molten iron is thrown to the lower end of the mold, and the casting will be strained and made thicker at the lower than at the upper end. In such a case the heavy part always warps the light, making it more difficult to mount the stove. This straining can be prevented by ramming the mold a little harder at the lower end, but there is not one stove molder in fifty who ever notices whether his flask is level or not. He merely rolls it over and sees that it lies solid. If the floor is uneven, the flask may be 3 inches higher at one end than at the other, and the molder will invariably ram the high end harder, because it is the handier. This has the effect of making the high end lighter and the low end heavier than they should be.

If floors are not made of some material that is hard or will become hard, they will be dug up when the sand is shoveled, will soon become uneven, and by mixing with the sand will make the heaps dirty. Last summer I visited some large stove foundries where the floors were made of sand or some soft clay. The molders had scraped off a little of the floor every time they shoveled up their sand, until they had got down to the cinder bed, their sand heaps being full of cinders and ashes. Yet the company was having all its sand ground and bolted in order to make first-class work, and when the molders wanted new sand they would always get some that had been ground and bolted, and mix it with their old sand that was full of cinders and ashes. If some of our stove founders would pay more attention to their molding floors they would be able to produce a better quality of plate, and would save the expense of grinding and bolting their sand. In almost all the large stove foundries of the eastern district the floor allotted to each molder is numbered, the number being marked in large figures on the wall or beams at the end or over the floor. When work is sent in or taken out, the pattern or flask wheeler is told the number of the floor to or from which it is to be taken, instead of the name of the molder. This saves a great deal of trouble, for in many cases the wheeler does not know the name of every molder in the foundry, and it often happens that there are two or more molders of the same name, so that the pattern or flasks may be taken to the wrong man.

SAND FOR STOVE FOUNDING.

For stove founding a very peculiar grade of sand is required. It must be of a very fine grain in order to make smooth plates. It must contain sufficient loam to give it strength enough to hang together and resist the pressure of the molten metal, and yet it must neither be too fine nor contain too much loam, or it will pack so closely that the gas cannot escape freely from the surface of the mold, making it difficult to produce a casting free from blow-holes. A sand possessing all these properties is very difficult to find, and it is only in certain localities that first-class sand for stove founding can be obtained. In almost every part of the country sand is found than can be and is used for stove founding, but it does not give the plate a fine surface, and a great deal more care and labor is required in working it than would be necessary with a first-class sand. The best molding sand in this country for stove founding—that which is reputed best, at any rate—is found near Albany and Troy, New York, and is called the Albany sand. The Waterford sand has a good reputation, but it is of the same nature as the Albany, and the two are often called by the same name. This sand is largely exported from Albany to all parts of the country, almost all the large stove founders in the Eastern and Middle States, and some of the Western States, using it exclusively. There are various grades of this sand, some veins or banks being finer than others, and when purchasing it for stove founding care should be taken to procure the finest quality, as all Albany sand is not good for stove founding.

A very fine quality of sand, said to be equal to the Albany sand for stove founding, has lately been found in New Jersey, but I have not visited any foundries where it is used, and cannot speak with certainty as to its good or bad qualities. Another fine sand is found at Sandusky, Ohio. It is equal to the Albany sand, and will give as fine a surface to the plate when it is new, but after it has been used for a while it becomes rotten, and will then wash before the molten metal. It is then almost impossible to make a casting in it free from sand holes, nor can the heaps be kept in good order by adding new sand. The trouble with this sand is that it does not contain quite enough loam to give it sufficient strength to be worked alone, but it is splendid for mixing with a sand that contains too much loam and is so close that the vent cannot escape. A good molding sand is found near Cincinnati, Ohio. It is called "Cincinnati sand," and is largely used through the West, but it does not give so fine a surface as the Albany sand. When a suitable sand for stove founding cannot be found, a good sand can sometimes be made by mixing two or more grades possessing different properties. It often happens that a very fine-grained sand is too close and strong for stove plate, while a coarse-grained sand is too open and weak. If these two grades be mixed, the fine sand will give more strength to the weak sand, and the coarse, open sand will make the fine sand more porous, so that the two together make a better molding sand than either alone.

In this way a suitable sand for stove founding can be procured in almost any part of the country. When two or more grades of sand are to be used in the same heap, they should be mixed and riddled together before they are put into the heap, for unless they are, a careless molder may get all of one grade of sand in one part of the heap and another grade in another part. In this case he will produce poorer castings than if his entire heap were composed of the poorer of the two grades; for, however poor the sand may be, a molder will become accustomed to it so that he can produce a pretty good casting; but, if he has two or three grades of sand in a heap and does not know where any of them are, he can never become accustomed to that heap, and all the good castings he makes are merely chance work. Therefore, in order to make a good molding sand out of various grades, these must be thoroughly mixed so as to obtain a uniform quality throughout.

In stove founding much more care is required in tempering the sand than in any other kind of founding, for in this work the plates are very light, and the molten iron must be spread out in a very thin sheet over the sand. It is then very sensitive, and the least variation in the temper of the sand is visible on the casting in the shape of blow-holes or scars. The sand had better all be a little too wet or a little too dry than wet and dry in spots, but it is desirable that it should be neither wet, dry nor spotted. The cry of poor sand from the molders is often more imaginary than real, and in many cases the trouble complained of can be overcome by using a little more judgment in tempering and working the sand.

Customs Dispute.—A curious dispute has arisen between the French and German customs authorities with regard to the application of the conventional tariff between the two countries. It appears that a short time ago a German house received an order from Paris for a quantity of hay forks and other articles, and they were duly despatched, together with a statement by the French Consul that they were of German origin. Notwithstanding this, the goods were stopped at the frontier and taxed according to the general tariff, on the ground that the articles were not manufactured in Germany. A protest followed, to which the French government replied that they were bound by the report of experts. Another consignment of forks was made, and the whole history of

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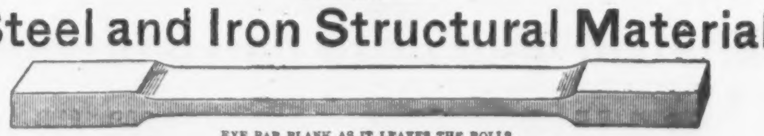
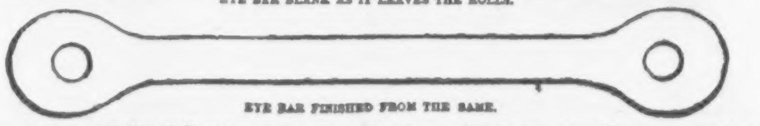


EYE BAR BLANK AS IT LEAVES THE ROLLS.



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the first repeated, the experts emphatically declaring that the forks were of American make. The German house then sent on a few forks in various stages of manufacture, explaining in a detailed report the processes they had undergone, and challenging the opinion of competent judges from the district of Arnsberg, the place of their works. What action will be taken on this remains to be seen.

Cable Laying Under Difficulties.

The Ottawa *Citizen* gives the following interesting account of the landing of a cable on one of the islands at the mouth of the St. Lawrence:

About 20 miles north of the Magdalen Islands are two precipitous rocky islets known as the Bird Rocks, with cliffs either nearly perpendicular or over-hanging, and from 120 to 140 feet above the ever-surging seas at the entrance of the Gulf of St. Lawrence. For centuries these remarkable rocks have been the home of the gannets—large gulls, which congregate there in countless myriads to hatch their callow young in fancied security. The requirements of commerce soon, however, demanded other uses for the larger island, whose area of less than seven acres is now covered with a close growth of fine grass. This rock, standing like a grim sentinel to warn off vessels from the treacherous quicksands of the Magdalen group, which extend southerly nearly eighty miles, was peculiarly available for a lighthouse station, and in the year 1868, two ladders of 60 feet each in length, were iron clamped to its cliff; cranes (one being worked by steam) were erected over points which overhung the ocean, and a keeper with two assistants were finally left in charge of a strongly-secured tower of low altitude, showing a powerful dioptric light, which gives confidence to mariners when either entering or departing from the waters of the great St. Lawrence. After five years of able advocacy by the Hon. Dr. P. Fortin, M. P. for the country of Gaspe, P. Q., the government of the Dominion of Canada, under the Premiership of Sir John Macdonald, determined to connect the rock to the Magdalen group, and thence to Cape Breton, N. S., by two submarine electric cables, as a section of Dr. Fortin's comprehensive scheme for connecting Anticosti, the Magdalens, St. Paul's, Sable and other smaller outlying islands with the existing system of telegraphy throughout the Dominion, so that aid may speedily be sent to vessels in distress or ashore, the observations of the meteorological service more extended, and in the spring the state and position of the ice in the gulf regularly and reliably ascertained, and last, though by no means least, the fishermen may be informed of the absence or presence of fish and bait. For the more effective establishment of the service the Canadian Ministry appointed Mr. F. N. Gisborne, C. E., whose name is well known as the first practical mover in and originator of transatlantic telegraphy, as their superintendent of the telegraph and signal service; the steamship Newfield was sent to London to be fitted as a cable-laying and repairing ship, and Mr. Gisborne having made the necessary contracts with the India Rubber, Gutta Percha and Telegraph Works Company, of Silverton on Thames, the vessel, fully equipped, returned to the Gulf of St. Lawrence and commenced operations October 16th, 1880, although the season was already too far advanced for cable laying in such latitudes upon the American coast. Under so experienced a cable layer as Matthew Gray, the manager of the above company, Mr. Kingsberry, his engineer, and Mr. Ripon, assistant electrician (the company having undertaken the risk of laying the cables) the Island of Anticosti was within three days successfully connected with the mainland at Gaspe, and the steamer Newfield, with Dr. Fortin a guest on board, then headed for the *bête noir* of the expedition, the much apprehended rock of the gannets. On October 20, with the weather exceptionally fine, the Newfield was anchored one-third of a mile distant from a cliff 140 feet high, to and up which it was necessary to extend the shore end of a cable weighing fifteen tons per knot. From the summit a rather fragile looking rope suspended three small ladders at different altitudes, and upon the lower one rested, some 20 feet above the surging waters, one of the lighthouse men. A large boat from the Newfield, in which sat Messrs. Gray, King, Gisborne and Ripon and Dr. Fortin, then approached the human spider on the cliff sufficiently near to be informed that he had selected the best and only spot where a cable could be landed. Such information would have been deterrent to most men; for it appeared to be an almost impossible undertaking to land a heavy cable in such a position, and under such impression the boat was steered to a lower portion of the rock, where, as already described, the two 60-foot ladders were clamped to the cliff. After sundry bumps, which almost stove the boat, the party landed upon some water-washed slippery rocks, upon one of which Mr. Gray endeavored to leave an impression by sitting down with a precipitancy which must have loosened his teeth. Mr. Gisborne was first up the ladder, and in due course was followed by the ponderous, though powerful, doctor, whose 16 stones was a sufficient proof that the rungs of the ladder were safe transit for all adventurous followers. Arrived upon the summit, and after a most unwilling approval of the landing place selected as the best possible, not a minute was lost; the steam crane was fired up with pickings from three or four barrels of refuse band or shale which some rascally contractor at Quebec had shipped for coal (at government expense), a cruel outrage upon the poor men who are doomed to six months' winter service upon a rock where even a stick of drift-wood is not available to keep them from freezing. Soon a wire rope was passed from the steamer and made fast to a line from above by the spider man, and by it a stout manila rope was drawn up the cliff and passed to the steam winch, to be followed by a line of boats, supporting the weight of the electric cable as near into the foot of the cliff as practicable. Then came the tug of war; the winch being weak required the assistance of falls and tackle,

until at last, after a twelve hours' struggle, the little breath unexpended announced, in husky cheers, the cable safely moored to the case of the lighthouse. The steamer finally ran out a mile of cable seawards, cut and buoyed it; and thus was effected probably the most difficult and dangerous cable landing hitherto made by the determination and ingenuity of man. Meanwhile the instruments, stores, &c., having been hoisted up by the second winch, and all having been connected up in good working order, this unique telegraph station was left in charge of Mr. Chaisson, keeper of the lighthouse of the gannets.

Apprentice Schools in France.

Amid the new conditions of labor under which the former relation of master to craftsmen has been replaced by that of capitalist to employees, the old system of apprenticeship has everywhere decayed. In those countries where, as in England, no substitute has been found for it, the loss of the technical training once assured to young workmen has had a most damaging effect upon the national industries. The urgent need for some remedy for the existing state of things is recognized in Great Britain, and various methods of imparting an adequate knowledge of handicrafts and skill in manipulation have been suggested. Example in such cases is, of course, more impressive than the most ingenious theory, and Prof. Silvanus P. Thompson has done a good work by showing the English and American readers of the *Contemporary Review* what and how much is accomplished in the apprentice schools of France.

By way of illustration, four typical establishments are selected, all of which are situated in Paris, and exemplify various combinations of a workshop with a school. There seems to be no reason why these institutions, or some modification of them, more exactly adjusted to the local conditions of labor, should not be reproduced in England or the United States. The oldest of the schools described, the Institution of St. Nicholas, founded in 1827, is under the management of a religious guild exclusively devoted to education. There are here 890 boys, all children of artisans, who pay $6 a month for their board and lodging. Small as the individual contribution is, the aggregate income and expenditure of the establishment amounted last year to $230,000, although the services of the friars who conduct the school are given at a nominal rate. The average age of the pupils on entrance is 11 years, but none are admitted who cannot already read and write. The greater part of every day is given up to manual work, only two hours being reserved for book studies on three days of the week, the same amount of time on the alternate three days being devoted to drawing. There are on the premises a great number of workshops, each let out to an approved craftsman, to whom are apprenticed, for a term of three or four years, some ten or twelve boys. The trades thus taught are those most sure of occupation in Paris, such as those of carpenter, wood turner, wood carver, marble mason, brass worker, carver and gilder, clock maker, compositor, printer, wood engraver, and so forth. In these shops nothing is made that will not sell, the apprentices learning the value not only of materials, but of time, and although the works that pass under their hands are graduated to their capacity, they are of precisely the same character as those which apprentices in any ordinary workshop would have to undertake. The apprentices earn nothing during their term of service beyond a little pocket money when they are well advanced, but when they leave the school they know the whole mystery of their trade, and are thoroughly expert artisans. They can take the raw materials and from them evolve a finished article, and they will earn at once from $1 to $1.20 a day, instead of the 40, 60 or 80 cents usually obtained in Paris by young workmen just out of their time. Their reputation, moreover, for steadiness, skill and general intelligence is such that the graduates of this school have little difficulty in securing uninterrupted employment, and, by the time they reach the age of 30, commonly rise to the position of foreman or master.

Another school which deserves to be scanned in some detail, both on account of its theoretical merits and the striking practical results, was established eight years ago by M. Léon Say, at the expense of the city of Paris. Boys are received here at the age of 13 or 14, provided their primary education has been completed, and after a three years' course are turned out with sufficient experience and technical skill to command from $5 to $8 a week, wages which are reckoned in France exceptionally good for young journeymen artisans. The instruction offered at this school is not only gratuitous, but actually remunerative, for the pupils receive a weekly gratification varying from 30 to 60 cents. At this institution five hours a day are given to book studies, including modeling and drawing to a scale, and six hours to the work of the shops. There are two principal workshops—one devoted to the workers in iron, the other to the workers in wood, and the trades taught are forging, metal turning, carpentry, wood turning an l pattern making. During his first, or preparatory year, no attempt is made to specialize the work of the apprentice, nor is he expected to produce anything for sale, but the first twelvemonth over, he settles down to one specific craft, and henceforth all the articles he makes are salable. In this respect the municipal school seems to possess an advantage over the St. Nicholas Institution, because in the early stages of training, when workmanship is very imperfect, it is scarcely advisable to strive to produce a merchantable article. Better waste wood than spoil an apprentice, is the maxim followed. There is no doubt, too, that the general intelligence of the young workmen is furthered by allowing them to see something of all the phases of their trade, and of allied trades as well, instead of confining them by a premature division of labor to a single narrow function. The technical efficiency attained by the pupils of this school may be inferred from the fact that almost all the tools used were made by the apprentices themselves, and that several of the machines, as, for instance, a ribbon saw made by the boys of this establishment, attracted high commendation at the last French exposition. The whole cost of this institution, including land, buildings and furniture, to the city of Paris was $150,000, and the working expenses are $12,000 a year. Two hundred and twenty-one pupils, however, are already accommodated, and the benefits of the school will be speedily extended to a much greater number with a very slight increase of total disbursements.

A somewhat different type of training establishment is the Communal School, founded in 1873 at the instance of M. Salicis, a naval officer who has given much attention to technical education. The pupils are admitted here at a very early age, and they have not, as a rule, completed their primary education; but, if they stay out the prescribed three years' course, they not only get as good instruction in book knowledge as in any of the ordinary elementary schools, but they will also have seen something of constructive industry. An hour and a half each morning and afternoon are given to manual labor, and every pupil works from drawings which he has previously made to scale. During the first two years boys are sent to work in rotation at one after another of the different occupations of the workshop—as at carpentry, for example, one day, and at metal turning the next. It is only during the third year that a pupil settles down to some one pursuit, and at the Communal School no article whatever is made for sale, the accepted theory of the director being that the construction of saleable products would not afford so good a training for his boys. It is admitted, however, that they do not work so rapidly as apprentices brought up to keep constantly in view the exigencies of trade and to appreciate the commercial value of time.

Another example of a successful apprenticeship school deserves mention, because an attachment of the kind might be profitably made to many of our large industrial establishments. We refer to the school room and apprentices composing room established in connection with the great printing house of M. M. Chaix & Cie. The apprentices, of whom there are between 30 and 40, devote most of their time to the manual work of composing, only two hours a day being allotted to lessons in the school room. The term of service is four years, during which time the pupils receive wages rising from 10 cents to 50 cents a day for the compositors, and from 15 cents to 90 cents for the printers who work at the steam presses under the direction of a master. In the Chaix establishment every line set up by a pupil is, if possible, so much contributed to the current work of the firm, and as time exercises are frequent, the value of rapidity in manipulation is learned. At the end of the apprenticeship the pupils elect almost without exception to become employees of the firm, and enter at once into the rank of participants in the yearly division of profits. The remarkable intelligence which characterizes the pupils of this school has been ascribed to the fact that their technical knowledge has been acquired in the very midst of a great business, under circumstances which force them to comprehend commercial exigencies and the adaptation of complicated methods to large results.

It will be observed that only one of these successful institutions required much outlay, viz., the *Ecole Municipale* of Paris, which is paralleled at Lyons and Havre, and could easily be reproduced by any rich American municipality. The St. Nicholas Institution is self-supporting, so far as the workshops are concerned, though the pupils pay an insignificant sum for their board and lodging. The whole expense of the Communal School, salaries, tools and materials included, does not exceed $1600 a year, although, as we have seen, no articles are made for sale. As to the training school established by Messrs. Chaix, which has a number of imitators in France, this is actually looked upon as a main source of profit and prosperity to the concern.

Early Iron Making in England.—In the reign of Edward III iron was so scarce that the pots, spits and frying pans of the royal kitchen were classed among the king's jewels. Up to the end of the fifteenth century, English iron was not only dearer, but inferior, to that manufactured on the Continent. During the fifteenth century the manufacture of iron began to be extensive in Sussex, where the ore and timber for smelting it abounded, and iron mills soon became numerous in the country. The landed proprietors entered into the business eagerly, and not only were many ancient houses enriched thereby, but several new men acquired wealth and founded families. In the Forest of Dean also iron was largely smelted, but the land soon became denuded of trees in consequence of the exclusive use of charcoal for smelting; people became alarmed, and many edicts were fulminated restricting the manufacture of iron. Eventually the feeling became so strong that from the time of the Restoration the iron manufacture of England rapidly declined. Coal, as then used, injuriously affected the quality of the iron, and it was not till the beginning of the eighteenth century that steps were taken to overcome this difficulty.

The old practice in making boards was to split up the log with wedges, and, inconvenient as the practice was, it was no easy matter to persuade the world that the thing could be done in any better way. Sawmills were first used in Europe in the 15th century, but so late as 1555 an English embassador, having seen a sawmill in France, thought it a novelty which deserved particular description. It is amusing to note how the aversion to labor-saving machinery has always agitated England. The first sawmill was established by a Dutchman, in 1663; but the public outcry against the newfangled machine was so violent that the proprietor was forced to decamp with greater expedition than ever did Dutchman before. The evil was thus kept out of England for several years, or rather generations, but in 1768 an unlucky timber merchant, hoping that after so long a time the public would be less watchful of its own interests, made a rash attempt to construct another mill. The

guardians of the public welfare, however were on the alert, and a conscientious mob at once collected and pulled the mill to pieces.

The Mines and the Metallurgical Works of Prussia in 1879.

The annual detailed statistics of the production of the mines, salt works and metallurgical works of Prussia have just come to hand. Three hundred and ninety-four collieries, employing 118,819 miners and 26,664 persons above ground, and 2456 females, turned out 37,674,648 metric tons of coal, of which 2,580,324 tons were consumed by their own machinery, and 35,588,324 tons were sent to market. The production of lignite from 461 mines gave employment to 10,411 miners and 7912 men and 270 women above ground, the output being, in all, 9,278,354 tons. The returns show, besides, a production in the Province of Hanover of 26,000 tons of asphalt, and it may be interesting to add that the oil wells of the same province produced 47 metric tons of petroleum, so that as yet they cannot be said to be threatening to our producers. Rock salt was mined to the extent of 142,857 tons, the bulk of which, of course, came from the famous Stassfurt mines, which produced, besides, 41,181 tons of kainite and 306,995 tons of other potash salts, and 70 tons of boracite. Twenty-four thousand two hundred and ninety-nine persons were occupied in mining iron ore, of which 6486 men and 1594 women worked above ground. In all, 581 mines produced 3,153,091 metric tons of iron ore. The coal, lignite, iron, salt and metalliferous mines of Prussia together gave employment to 231,782 persons, of whom 170,992 work underground, while 53,795 men and 6995 women work above ground. The amount of ordinary salt produced from brine was 230,730 tons, besides which there were manufactured 34,006 tons of chloride of potassium, 2505 tons of chloride of magnesium, 8242 tons of glauber salt, 9999 tons of sulphate of potassa, 597 tons of sulphate of potassa and magnesia, 9675 tons of sulphate of magnesia, 2342 tons of sulphate of alumina and 2908 tons of alum.

Prussia has 36 charcoal blast furnaces, of which 30, running 1004 weeks, turned out 29,536 tons of pig; 130 blast furnaces, running 5890 weeks, on raw coal or coke, produced 1,607,969 tons of iron from 3,458,481 tons of domestic ore and 336,223 tons of foreign ore; 325,008 tons of mill and other cinder, and 11,939 tons of scrap. Besides this there were two furnaces working 45 weeks on a mixture of coal and charcoal, which produced 2165 tons of pig, so that the total output figures up to 1,639,676 tons of pig from 162 furnaces, running, together, 6939 weeks. These furnaces made 84,359 tons of foundry pig, 438,899 tons of pig for steel manufacture, 1,089,166 tons of forge pig, and 20,866 tons cast directly from the furnace. All the furnaces gave employment to 14,399 workmen.

Prussia has 162 works which make the casting of iron their only business; there are, besides, 96 foundries connected with metallurgical establishments, and 362 with machine shops, &c., in all 622 foundries, employing 20,387 men and 171 women. These have together a plant of 1197 cupolas, of which 864 were at work; 112 reverberatory furnaces, of which 85 were in operation, and 193 furnaces of various descriptions, of which 160 were working. It is striking that the Prussian foundries consumed as much as 162,878 tons of foreign pig and only 83,875 tons of German pig. Besides they melted 104,861 tons of scrap, chiefly from domestic sources. The foundries produced 136,234 tons of machinery castings, 25,444 tons of hollowware, 45,509 tons of gas and water pipe, 8719 tons of chilled castings, 1745 tons of malleable iron castings, and 86,961 tons of miscellaneous castings.

Prussia had in 1879, 277 works producing wrought iron, and giving occupation to 40,070 workmen. During the year, 140 out of 189 refining furnaces, 1348 out of 1962 stationary furnaces, 9 out of 14 rotary puddling furnaces, 683 out of 1019 welding furnaces, 357 out of 433 reheating furnaces, 7 out of 11 cement steel furnaces, and 237 out of 254 miscellaneous furnaces were in operation. These works worked 1,213,166 tons of German forge pig, 3681 tons of foreign forge pig, 100,628 tons of scrap and old iron, 59,219 tons of blooms and billets, and produced 56,325 tons of blooms and billets, 183 tons of cement steel, 7648 tons of iron rails, 8834 tons of railroad fish plates and bolts, 402 tons of railway axles, 2908 tons of car wheels, 5584 tons of tires, 227,171 tons of iron permanent way, 265,082 tons of merchant bar, 104,084 tons of refined bar, 53,893 tons of ordinary building shapes, 60,550 tons of bridge and ship shapes, 25,715 tons of forgings, 1088 tons of parts of machinery, 77,346 tons of plates and boiler iron, 42,334 tons of sheet iron, 42,256 tons of finest sheets, 8273 tons of tin plates, 178,430 tons of wire, 4092 tons of tubing and 43,236 tons of other miscellaneous articles.

During the year 1879, 31 out of 46 Bessemer converters, 23 out of 55 open-hearth furnaces, 17 out of 38 crucible furnaces for the manufacture of ingot iron, and 130 out of 290 crucible furnaces for the manufacture of steel, were in operation in Prussia. In the manufacture of ingot iron these furnaces consumed 356,311 tons of German pig, 106,878 tons of foreign pig, 39,165 tons of spiegeleisen, 2868 tons of ferromanganese, 5500 tons of wrought iron, 35,094 tons of ingot iron and 71,347 tons of scrap. For the manufacture of crucible steel, 6948 tons of puddled steel and 4764 tons of various materials were used. The Bessemer converters produced 464,642 tons of steel, the open-hearth furnaces turned out 56,827 tons of metal, and 1273 tons of steel were turned out by other apparatus. The production of crucible steel footed up to 26,509 tons. This material was sold as 64,989 tons of blooms and billets, 7238 tons of crucible steel, 317,782 tons of rails, 5046 tons of track materials, 10,491 tons of axles, 17,728 tons of car wheels, 23,261 tons of tires, 8968 tons of permanent way, 3413 tons of bar steel, 1790 tons of fine steel, 1777 tons of parts of machinery, 10,206 tons of guns and projectiles, 12,658 tons of ingots, 1632 tons of plates and sheets, 4035 tons of wire, and 27,830 tons of miscellaneous articles.

The smelting works of Prussia produced 96,482 tons of spelter and zinc, 76,013 tons of lead, 3143 tons of litharge, 9607 tons of copper, 134 tons of silver, 576 pounds of gold. 81 tons of nickel, 326 tons of preparations of arsenic, 150 tons of alloys of antimony, 1239 tons of sulphur, 237,779 tons of sulphuric acid, 11,245 tons of oil of vitriol, 5468 tons of green vitriol, 40,977 tons of blue vitriol, and 1720 tons of zinc vitriol.

Ericsson's "Destroyer."

For the last five years Captain Ericsson has been working upon torpedoes. After many experiments he decided to use gunpowder, instead of compressed air, in the propulsion of submarine torpedoes carrying destructive charges of dynamite. His recent trials have been made with a projectile of peculiar form and a gun of novel construction. This trial gun is 30 feet in length and of 15 inches caliber, muzzle-loader, suspended under the bottoms of two wrecking scows, the gun being lifted above the water after each shot by shears and suitable tackle. The present projectile of the Destroyer (as Captain Ericsson calls his perfected invention) is the result of the extended trials referred to; its length is 25 feet 6 inches, diameter 16 inches, and its weight 1500 pounds, including 250 pounds of explosive material. It is made principally of wood, and its shape somewhat resembles a cigar. The point, or dynamite section, about 5 feet in length, from the vertex to the base, is made of copper, and a cast-iron armature is affixed to the tail to balance the weight of the opposite end. As it is made of wood principally, the "experimental" projectile, after it has run its course, will rise to the surface, and is readily recovered. For firing this projectile Captain Ericsson has applied to the Destroyer a gun similar to the one used in most of the experiments, but a breech-loader. It is a smooth-bore gun, 30 feet in length, of 16 inches bore, and is hooped with steel. The breech is locked upon the Dutch principle, and when unlocked is swung upward and over, with a hinge connection for the gun to receive the torpedo and the charge of gunpowder.

The results of the first experiments having proved satisfactory and successful, Capt. Ericsson has built, at his own expense, an iron vessel, which he has appropriately named the Destroyer. This is now on the Hudson, where the experiments with the new torpedo have been carried on extensively for several months. These were concluded on November 11. Preparations are now making for a steam trial to determine the actual consumption of coal per mile, and to decide whether sufficient coal can be carried to take the vessel across the Atlantic. There is no armament to be seen, nor anything that gives the Destroyer the appearance of a war vessel to an ordinary observer, unless it may be her singular design. The form of the hull is very peculiar, the ends being precisely alike, and terminating with very fine wedges, probably sharper than any other vessel of deep draft yet built. The length is 130 feet, depth 11 feet, and beam 12 feet, thus presenting the unusual proportion of 11 times greater length than beam. The leading feature of the construction is that the vessel is provided with an intermediate curved deck, extending from stem to stern, composed of plate iron, strongly ribbed, and perfectly water tight. This intermediate deck sustains a heavy, solid, deflecting armor plate placed transversely to the line of keel 32 feet from the bow, inclined at an angle of 45 degrees, and supported on the aft side by a wood backing 4 feet 6 inches deep at the base. The steering wheel and electric batteries for discharging the torpedo gun are placed behind this wood backing. A deck-house or cabin 70 feet long, composed of plate iron, is riveted water-tight to the upper part of the hull, and its forward end comes to the deflecting armor plate. This cabin is for the quarters of the officers and crew, and for the officer in command of the vessel, who has a view of everything ahead of him through a glass port. He steers the vessel and discharges the gun without fear of the enemy's guns, as he is protected by a wrought-iron armor plating in front of him, sixteen inches in thickness. From the steering wheel runs a wire rope to a valve near the stern, by which water pressure is admitted alternately to the hydraulic cylinders at the stern, the motion of whose pistons turns the rudder. The rudder of this novel craft is another important feature, as it is wholly unconnected with the visible part of the stern, being attached to a vertical wrought iron post welded to a prolongation of the keel just aft of the propeller, its upper part being about five feet below the water-line when the vessel is in motion at full speed. The tillers consist of tin plates of iron riveted on opposite sides of the rudder, a few inches from the bottom. These tillers are operated by straight rods, connected with the pistons of horizontal hydraulic cylinders, of five inches diameter, attached to the sides of the keel. Accordingly the steering gear will be placed ten feet below water-line.

The gun from which the torpedo is fired is placed on the bottom of the forward part of the vessel, the muzzle terminating in the stem 7 feet below the water surface. Water is prevented from running into the gun by an outboard valve, opened and closed automatically. A small quantity of water rushes into the gun between the discharge of the torpedo and the closing of the valve, which is allowed to run into the bilge through the breech and pumped out with a steam syphon. The projectile, with its charge of 250 pounds of dynamite, is first put into the gun, and in the space between the tail of the projectile and the breech of the gun is put the charge of gunpowder. The breech is then closed, and when the Destroyer is within 300 or 400 feet of the enemy's vessel the gunpowder is ignited by electricity and almost at the same instant the projectile has struck the hostile vessel below the water line and destroyed her, the torpedo having been discharged by concussion alone. The initial velocity with which the projectile leaves the gun is 250 feet per second. With minimum charges of powder, in recent experiments, the projectile traversed the first 310 feet in three seconds. In all of the experiments which have been made, common cord nettings have been

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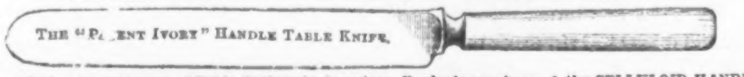

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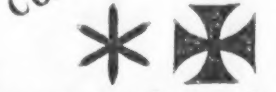

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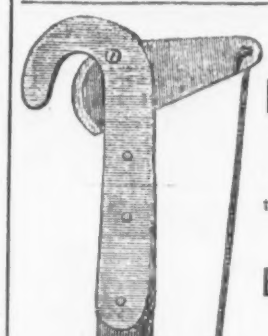

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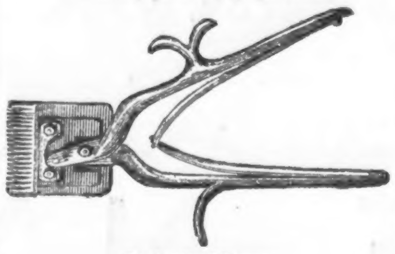

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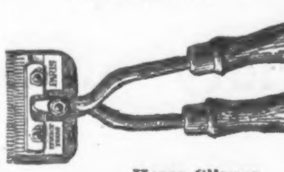

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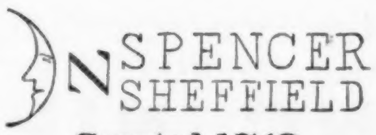

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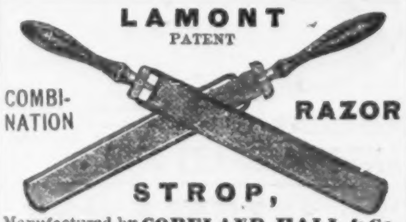

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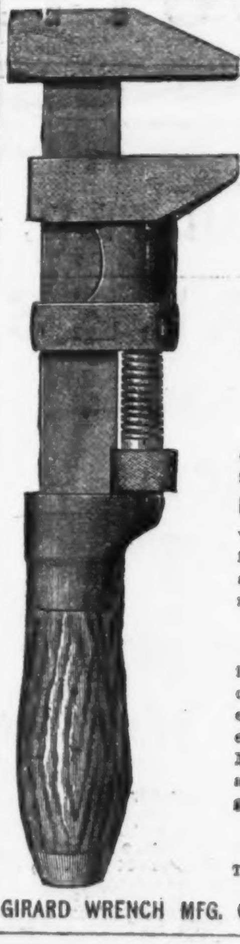

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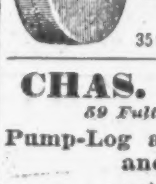

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used to determine the curvature of the trajectory, but at a firing distance of 300 feet the course of the torpedo through the water has been absolutely straight. The projectile is exploded entirely by concussion, and is intended to strike a vessel at any point under the water, and will pierce any netting that may be used for protection. It is supposed that a vessel like the great British ironclad Inflexible, even with a hundred water-tight compartments, could be sunk by the explosion of a single projectile. The tide currents have no serious effect on the course of the torpedo at its high speed, nor can its course under water be detected, as it makes no commotion after it leaves the gun.

The machinery of the vessel is entirely below the water-line, and is under the intermediate deck, so that it cannot be disabled by the shot of the enemy. It is simple and compact, and so arranged that two engineers and two firemen can take care of it. The boiler and engine rooms are connected, and the fires, the quantity and condition of the water in the boilers, the pressure of steam and the working of the engines are under the immediate observation of the engineers. Two boilers are placed amidships, where there is the least motion. They have single furnaces and a large amount of heating surface. The main condenser of the two direct acting engines forms the bed-plate, and the entire steam machinery is so compact that it occupies a space of less than 8 feet square. The steam cylinders are of 22-inch stroke and 24 inches diameter, and can be worked up to 1000 horse-power. The ordinary number of revolutions is 125 per minute, giving an average speed of 16 knots an hour. The lower division of the vessel is supplied continuously with cold air by blowers drawing it in from above to furnish draft for the fires and fresh air for those on board.

When ready for action the Destroyer is intended to be as deeply sunk in the water as are the monitors, the vessel being submerged nearly to the level of the main deck; but this deep immersion need not alarm the ship's company, as it sometimes did in the case of monitors during the war, because the deck-house has no opening on the sides. Therefore it virtually forms part of the hull, and it would be safe to run with the upper deck considerably below the water line. Owing to the peculiarity of construction, the entire superstructure and the upper part of the smoke pipe might be shot away, and still not disable the vessel; and, Captain Ericsson says, it can live at sea in any weather. Being protected by heavy inclined transverse armor, the Destroyer, attacking bows on, can defy heavy ordnance, and, apart from the swiftness of its projectile through the water, can outrun iron-clad ships and be certain of destroying them. The most important advantage attending the substitution of gunpowder for compressed air will be that of saving the time lost during the operation of charging. In action a loss of time might prove fatal, since the enemy's vessel, which might have escaped being struck, would have time to change its position or retreat.

The Proposed Exhibition of 1883.

The Committee on Sites of the United States International Exhibition have reported, recommending the Central Park. After an examination of the various sites proposed, and after the discussions which had been had before the committee by the persons advocating the various proposed sites, the committee was satisfied that it would be detrimental to the exhibition if any site belonging to private persons was taken therefor, because of the excessive cost of the acquisition and adaptation of the property required for the purposes indicated. The Executive Committee, therefore, resolved that in its judgment it was the imperative duty of the authorities of the City and State of New York to allow a portion of Central Park to be occupied for the purpose of the exhibition. Whether there were any objections to the passage of the resolution could not be ascertained from the chairman of the committee. He declared that he was not at liberty to give further information concerning what was done by the committee.

In reference to the legal steps necessary for the World's Fair people to secure and occupy the needed ground in Central Park, there is a difference of opinion. Some think that it will be necessary to have an act of the Legislature setting aside a certain portion of the Park for the World's Fair of 1883, while others hold that the Park Commissioners possess the requisite authority to grant such lands without applying to the Legislature. In respect to this point, Park Commissioner Samuel Conover said that he did not think it would be necessary to procure a Legislative act. Under the law he believed that the Park Commissioners already possessed ample authority to assign a portion of the Park for the proposed Universal Exhibition, and that without asking any further powers from Albany. Whether or not the board would do so he could not say. No demand had as yet been made upon them, and the subject had, therefore, not been discussed. On the demand being made there would be a thorough discussion, and all the arguments pro and con would be gone over, before the Commissioners made their decision. He had no knowledge as to what portion of the Park or how large a portion of it would be required, or as to any of the other details. When the demand was formally made he thought it would be time to consider it. Of the authority of the board to grant the requisite permission, however, he had no doubt.

Commissioner Andrew H. Green said he was decidedly hostile to the proposition to establish the fair in the Park. The Legislature, at times, did very extraordinary things, but he did not think it would grant this right, if asked to do so, in the face of the public sentiment that would be aroused against it. There was some condition expressed in the charter of the Exhibition Company that required them, if they used public lands, to erect "a permanent building." It would be a matter for future consideration whether such a fixture was wanted in Central Park. It was undoubtedly a large place, but it would take a large part of it to form the fair grounds. The erection of the buildings there would necessarily destroy a very large amount of the natural scenery which money could never restore. The rock scenery of Central Park was not equaled in any other city park in the world. The fair buildings and landscape plans would require the removal or leveling of many of them; there would be a vast amount of excavation needed, and altogether the Park, as such, would be uprooted. It had already been encroached on by buildings of various kinds, which, to some minds, did not form proper adjuncts of a public park or place of open-air recreation. The title to the land was vested in the city, and the Park Commissioners were charged with the administration and management of the place as a park. He believed that their power under existing laws was complete for the prevention of any objectionable structure or work within its limits. He had looked casually over the act of the Legislature, passed last winter, incorporating the company, and from that reading had formed the opinion that it was a very loosely drawn bill in almost every particular, but purporting to grant some very extended powers and privileges. He could not yet say what the Legislature would do in furtherance of the scheme, but he did not think it could be carried out. As to the views of his colleagues in the Park Board, he knew nothing, for he had little or no communication with them. They understood nothing about the business of administering the affairs of the department or maintaining the parks, and, as a consequence, he and they did not exchange views on matters other than those that actually came before them.

Commissioner Wenman's views on the subject are very explicit. "I have always," he said, "contended that the Board of Park Commissioners is simply the custodian of the public parks, and that it has no right to authorize the use of a part or the whole of any of them for any purposes other than those for which they were laid out and established. The records of the present board will show that it has been unanimous at least in opposing invasions of Central Park, and I am of the opinion that the sentiments expressed in the resolution of the World's Fair Executive Committee will not be favorably received. Without attempting to predict what may be the present views of the other Commissioners in relation to the question, I am prepared to say that I shall vote in accordance with the opinions I have always entertained as to the legal inability of the board to authorize encroachments on the parks. That portion of the Battery occupied by the elevated railroad was voted away prior to my appointment as a Park Commissioner. That act of the board was illegal, and I have since believed that the people could compel the railroad company to remove the obstructions, simply on the ground that the permission to place them there was given without the authority of the Legislature. From the fact that the Executive Committee of the proposed World's Fair cannot but be aware of the sentiment of opposition pervading the Board of Park Commissioners respecting the granting of a portion of Central Park for any purpose other than that for which it was originally designed, it is to be inferred that it relies upon legislative interference in its behalf. It has no reason, as far as I can see, to hope that the Commissioners will yield any portion of the Park unless they are obliged by a special enactment to do so. It is safe to assume that the majority of the people of the city are opposed to the use of Central Park as a site for the contemplated exposition."

Working Wire.

There are many jobs which require wire in some one of its many sizes and in some form, as rings or springs, to complete them. Improperly treated, wire is a very obstinate material; if at all "springy" or possessing temper, either from condensation by drawing or by hardening, it will not occupy the space or shape in which it is formed, and calculation or experiment is necessary to guide the workman to a satisfactory result. All wire of any stiffness, when coiled, will open or expand, making the coil larger in diameter and longer in stretch. In ignorance or neglect of this quality, a workman once tried to form a spiral spring of wire to play upon a flat rod one inch wide by three-eighths of an inch thick. He wound the wire on the flat rod, and when released the spiral was a sight to make his shop companions laugh. The coil was elegant, but scarcely useful; its short diameter and its long diameter alternated in a beautiful geometric spiral, instead of preserving a straight line. Sometimes it is necessary to make a spiral—or, rather, a coiled spring—of a certain diameter to fit a hole, or to fit a rod acting as its core or support. It is impossible to give rules to determine the amount of expansion of the coil in diameter, as the nature of the material is so varying. This variation comes from the stiffness of the wire, the size of the wire and the material, whether brass, iron or steel.

In the case of desiring to produce a coiled spring of a certain diameter, it is best to try a simple experiment with the specimen of wire to be employed. Wind one or two turns on a rod of the proper size of the core, and then releasing it, measure the interior of the ring or spiral, and compare with the diameter of the core or rod. Reduce the size of the core or rod to an amount a little more than the difference between the size of the hole in which the spring is to work and the rod on which it was formed. If the wire is of a guage that when wound on a half-inch rod it will fill loosely a hole three-quarters of an inch in diameter, but when allowed to expand the coil requires a hole seven-eighths of an inch, wind the wire on a rod three-sixteenths of an inch smaller than the half-inch rod. This example may not be definite enough to be made into a rule, but it is given as an illustration. A trial should be made as before mentioned, by coiling the wire around a core of the estimated diameter, and thus determine the amount of opening or spring of the coil. It may be feasible, in some cases, to anneal the wire before forming it into springs. In this case the wire can be wound to the finish size at once. But with brass or iron wire, the springiness of which depends upon the condensation of the particles by the drawing

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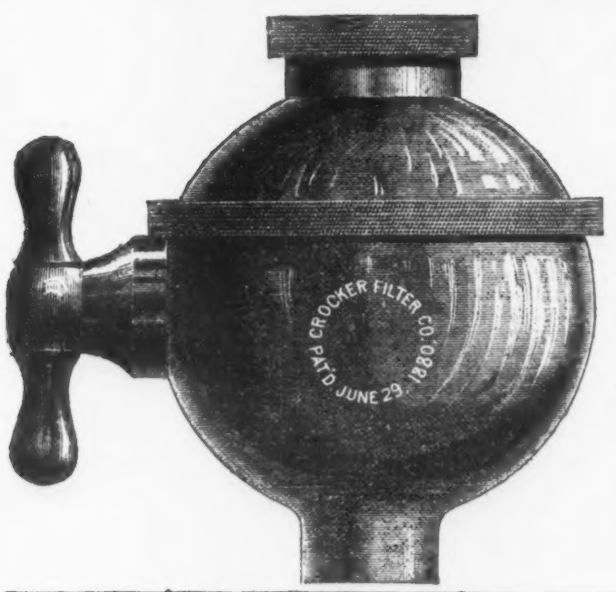

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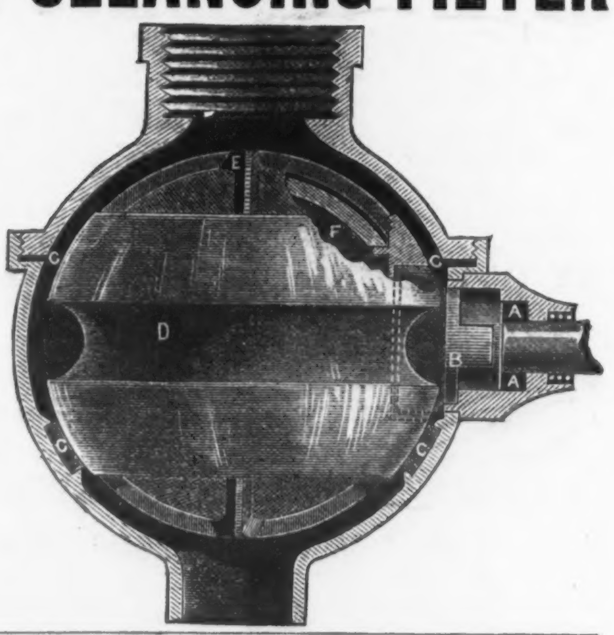

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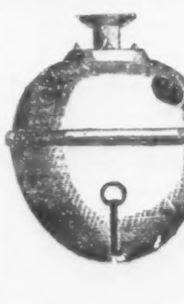

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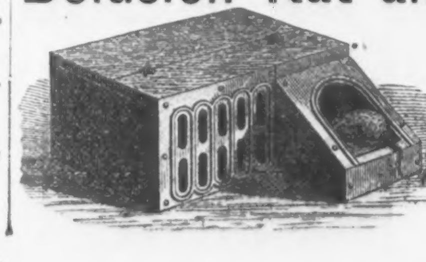

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dies, this plan is not practicable, as hardening and tempering by heat and water will not restore the stiffness of the wire. But with steel wire it is better to use the wire in an annealed form, making the spring just as it is to be in its finished state, and then tempering it, a process which is described further on.

It is a comparatively easy matter to make a close or expanding coiled wire spring in the lathe. The size of the core rod having been determined, all that is necessary is to keep the winding wire close to the previous coil, and this can be done by hand feeding and guiding. The rod on which the spring is wound is placed on the lathe centers, and one end of the wire secured in the dog end, when the lathe may be started on a slow speed, the wire being led to it by hand. This is a handy way also to form rings, the coil being cut apart either with a file or cold chisel.

But in forming open or compression springs, there must be greater care employed. The stiffest open spring from a certain size of wire is that which has the interstices of the same space as the wire's diameter; so, such a spring—or rather two of them—may be formed by winding two wires at the same time, making a close spring, doubled. When completed, one is unscrewed from the other. A more open spring may be guided by means of a thin piece of iron with a hole large enough to receive the core on which the spring is wound, the hole being in one end of the piece and the other having a handle attached. A small hole should be made through the piece close to the large hole to receive the wire. In operation the guide is slipped on the core spindle up to the dog end, the wire passed through the small hole and secured by the dog. Then start the lathe, holding the guide close against the rotating core, pulling toward the operator, and the wire, passing through the small hole in the guide from one side, winds against the guide on the other. It is evident that the thickness of the guide will determine the width between the coils. A still better way of forming an open spring is to use an engine lathe with screw cutting feed. With this the grade of the spring may be determined with great accuracy.

Sometimes it is necessary to close the ends of close coiled springs, so as to make a central pull by means of hooks or loops. There is machinery to do this with rapidity, but for ordinary jobs hand work is sufficient. The closing is effected by a gradual reduction of the diameter of the coils at the ends of the spring. Unless the wire is very rigid and obstinate, repeated blows with a mallet, a lead hammer or a copper hammer will do the work satisfactorily. The open end of the spring should be held at an angle on the bench block and the hammer wielded, striking backward toward the held end of the spring, the spring being turned in the hand in the direction of the coiling. Before the end is closed, a looped piece of wire should be introduced to form a holder for the end of the spring, the projecting end of the looped wire to be formed into a hook or ring.

Large springs of large wire (which form its size and rigidity) that cannot be managed during winding by the hand, should be made on a contrivance similar in principle, build and operation to the tire tenders in the blacksmith shop, or the pipe formers in a tin shop. These consist of two rolls to give a forward motion to the material and another to give the curvature. In spring forming the modifications consist in substituting narrow wheels with a V or segmental groove on their peripheries for the two rolls which receive the wire, and a guide instead of the back roll to produce curvature. The two grooved wheels should be geared together, so as to turn in opposite directions, and the guide should be a curved piece, standing at an angle to the axial rotation of the rolls or wheels. And this guide should be capable of being set up to the rolls or moved back from them, to determine the diameter of the coil, and should also be capable of being inclined from a vertical position, more or less, to make a close or open spring. The guide should have a lip on its working edge to guide the wire. With such a contrivance coiled springs of steel rod a quarter of an inch and more in diameter may be readily formed.

Sometimes a weak spring is required where a flat forged spring would be costly. In this case a piece of stiff wire of hard brass or unannealed iron may do the work when coiled two or three times around a core, the coiled portion forming the spring, leaving ends to be formed into loops or secured by screw, or left to act on the movable attachment it is to actuate, as a pawl. The principle of such a spring is seen in an extreme form in the U, or main spring, of a gun lock. In this spring the two long arms have little to do with its action, the spring or life being wholly in the curve between the two arms. The wire spring has its curve in one or more complete circles.

Coiled springs of steel wire are tempered by heating them in a box or piece of gas-pipe, in which they are packed with bone dust or animal charcoal, precisely as though they were to be heated for case-hardening. If a piece of gas pipe is used, which is very handy in such work, one end should be closed by a screw plug or cap, and the open end luted with clay. When sufficiently heated—the box or pipe deep red—remove the spring or plunge spring and its receptacle together into a bath of animal oil. Do not attempt water hardening or the use of crude petroleum. If common whale oil is not handy, melt lard and use it while it is liquid. The wire will be sufficiently hard to require drawing. This should be done by putting the spring in a shallow pan, with tallow or animal oil, over the forge fire, and agitate the pan and its contents until the oil takes fire. Take the springs out, and when the oil is burned off cool them in water.

A Brave Spanish Miner.—An act of distinguished gallantry was recently performed in one of the principal mines in the mining district of Linares, in Spain. Three miners were engaged in sinking a shaft, and after charging the bore-holes with dynamite two of them climbed to the gallery above, the third, as is customary, remaining behind to light the fuses attached to the charges. Having done so, he signaled to his comrades, and was in the act of being hoisted up with a windlass and rope, when, on nearing the mouth of the shaft, he by some accident lost his hold and fell a distance of 50 feet to the bottom of the shaft, where he lay stunned and disabled, in close proximity to the burning fuses. A chain ladder fortunately communicated with the bottom of the shaft, and on observing the fall, one of the miners at the windlass, placing his drawn knife between his teeth, went down without a moment's hesitation to the rescue of his injured comrade, and severed the fuses as they were on the point of igniting the charges, thus saving both from an awful and instantaneous death.

Iron Steamboats for New York Waters.

The Philadelphia *North American* says: When the announcement was made that a company had been formed with a capital of $10,000,000 for the building and the operating of 15 or 20 iron excursion steamboats between New York city and the various summer resorts like Coney Island, Long Branch and Manhattan Beach, it was regarded as a pretty scheme on paper, but the men behind it, such as Rufus Hatch, John Roach, Charles H. Cramp and others equally well known, meant business, and the Iron Steamboat Company of New Jersey was the practical result. Of late there have been frequent meetings of the Board of Directors, and the project has gone so far toward accomplishment that contracts for the construction of six steamers have been properly signed, and others will rapidly follow. The probabilities are that the work of building this numerous fleet will be about equally divided between Roach and the Messrs. Cramp. Up to this time each of the parties have secured three. The contracts call for the delivery of this first batch complete by the middle of June. The boats will all be built upon the same model, which is an advancement upon the prevailing style of this class of marine architecture. They will cost about $250,000 each, and have the capacity of carrying from 1000 to 1200 passengers. The load line will be 200 feet in length, beam 32 feet, and depth of hold 12 feet. The side-wheels, which will be made of iron, will be driven by one engine, 52-inch cylinder and 11 feet stroke, with walking beam. The arrangements to insure safety from risk of collision are complete, and each vessel will be divided into several water-tight compartments. The means taken to guard against fire will also greatly lessen the chances of horrors from that direction. The boats will be very fast, the contracts calling for a speed of 20 miles per hour. This performance will enable them to successfully rival any steamboats now about New York, and consequently will make the company solid with the traveling and pleasure-seeking public. They will be fitted out as summer steamers, and during the excursion season will ply between Gotham and Coney Island, Long Branch, Manhattan Beach and points on the Hudson River and Long Island Sound. The material to be used in the construction of the hull will be iron of the first quality, and the craft will thus easily take the first rate. The contracts already given out will be speedily followed by others, and during the coming winter at least 12 will be built. But the company will not stop with that number. Others will be made next spring. The idea is to ultimately extend the operations of the company to other cities. The proposition is to utilize the boats in the winter by running them in Southern waters, such as between Savannah and Florida and other points where the business will warrant their operations. A gentleman who is financially interested in the company, in conversing about the subject last evening, said that there are now some 90 steamboats running out of New York, the majority of which are worn out and unsafe. It is positively known that many of them will be refused a certificate by the United States Steamboat Inspectors the coming season, and their owners will thereby be forced to withdraw them. This fact has been taken advantage of by the new company, and the public are to be congratulated, since there will be a heavy decrease in the crop of disasters from fire, collisions and boiler explosions, which the people of New York so justly complain of. The building of these steamers will give the mechanics employed at Chester and at Cramp's certain employment away into next summer.

New York's First Railroad.—It is less than fifty years since the first railroad was built in the State of New York. On the 29th day of July, 1830, ground was broken for the construction of a line by the Mohawk and Hudson Railroad Company, that had been incorporated by an act of the Legislature on the 17th day of April, 1826. About the 20th of July, 1831, twelve and one-half miles of the road had been completed, and on the 27th of the same month a locomotive, the De Witt Clinton, was placed upon the track. It was built by the West Point Foundry. Another locomotive had been ordered from Stephenson of England, which was placed upon the road on the 17th of September. A trial of the first locomotive was not successful. It was found defective in the capacity of the boiler, and portions had to be returned to the foundry for improvement. The road was formally opened by a grand excursion over the line on the 24th of September, 1831. Just as the company was about to start, the feed pipe of the English locomotive (the Robert Fulton) broke, and horses were substituted tandem. The train consisted of two cars. The three cars composing the other train were drawn by the De Witt Clinton. The locomotive made the return trip with all five cars in thirty-five minutes. The completion of this road was accomplished in the spring of 1832, the cars first used being coach bodies placed upon trucks and supported by thorough braces, in the manner of stages. The termini at Albany and Schenectady were inclined planes worked by stationary engines, and the cars were drawn up by means of a large rope, and balanced by a car loaded with stone descending the opposite track. This road was the first built in this State, and is now a part of the New York Central and Hudson River Railway.

The Iron Age

AND

Metallurgical Review.

New York, Thursday, November 25, 1880.

DAVID WILLIAMS - - *Publisher and Proprietor.*
JAMES C. BAYLES - - - *Editor.*
JOHN S. KING - - - - - *Business Manager.*

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Owing to the occurrence of a general holiday on Thursday of this week, we send *The Iron Age* to press a day earlier than usual. The appointment of one day in the year for thanksgiving had its origin in Colonial days, and was the outgrowth of the profound religious spirit of the time. To a great extent Thanksgiving Day has lost its original character as a religious holiday, and is now largely celebrated in a secular way; but it is an institution deserving of perpetuation. This year those who are so disposed can find a great deal to be thankful for in a retrospect of the happenings of the past twelve months. The general condition of the country and the outlook for the near future are matters for congratulation among all classes of citizens. We are at peace with ourselves and all the world, our national credit was never so firmly established, the policy of the government for the next four years will be shaped in the interest of domestic producers, labor is more largely and profitably employed than it has been at any time for years past, trade is in a satisfactory condition, all classes of the community are enjoying a substantial prosperity, and nothing seriously menaces the welfare of the nation. Even those who refuse to recognize the hand of an overruling Providence in human affairs, must admit that the improved condition of the country has been brought about by the operation of forces beyond individual, party or governmental control, and we shall sacrifice nothing of self-respect or the respect of others in feeling and expressing thankfulness for the substantial improvement which has taken place within a year.

The World's Merchant Navy.

The changes in tonnage, as well as in the number, of vessels of seafaring nations have been so great during the past four years that a few statistics showing the entire movement will be found of interest:

THE WORLD'S MERCANTILE MARINE.

July 1st.	Sailing vessels.	Reg'tred tons.	Stms.	Registered tons. Gross.	Net.
1877..	51,912	14,799,120	5,471	5,507,699	3,595,185
1878..	49,529	14,316,054	5,462	5,595,175	3,650,735
1879..	49,015	14,103,605	5,897	6,170,935	4,021,869
1880..	48,584	13,872,881	6,392	6,745,198	4,401,751

During the four years—1877 to 1880—the aggregate tonnage of sailing vessels decreased about 925,000 tons, or 6 per cent., but the net tonnage of steamers increased about 800,000 tons, or 22 per cent.

This change is easily explained when we come to consider that a steamer, by reason of greater swiftness and regularity in navigating, is capable of conveying in a given time about three times the quantity of goods and passengers which a sailing vessel of equal size can forward. Under these circumstances, it is not surprising that with increased facilities of transportation, sailing-vessel freights should gradually have been depressed to a point where profit to the owner has become less and less frequent. These and former statistics we have given sufficiently show that sailing vessels are steadily declining in number and aggregate tonnage, and that with few exceptions, chiefly in the case of Norway (for reasons we have before explained), this tendency is observable in all countries.

But while this decrease in sailing vessels is pretty nearly universal, the increase in steamers is not so under each flag to an equal extent, for all nations do not possess the means of buying or the facilities for building them. The consequence is that a great revolution is taking place in the carrying trade of the world, which becomes more and more concentrated in the hands of a few leading maritime nations. This will be seen in the following table:

INCREASE AND DECREASE JULY 1, 1878, TO JULY 1 1880.

Flag.	Sailing vessels. Inc. Vessels.	Inc. Tons.	Dec. Vessels.	Dec. Tons.	Steamers. Inc. Vessels.	Inc. Tons.	Dec. Vessels.	Dec. Tons.
British	....	......	42	209,352	571	508,398	..	.....
American	....	......	92	26,857	32	21,361	..	.....
Norwegian	....	......	3	1,103	27	10,388	..	.....
German	88	39,182	.....	....	57	20,390	..	.....
Italian	....	......	199	49,843	11	17,301	..	.....
French	....	......	200	54,085	65	55,082	..	.....
Russian	61	12,294	.....	....	18	15,812	..	.....
Swedish	....	......	78	14,482	76	14,217	..	....
Dutch	...	......	18	32,617	2	2,025	..	.....
Spanish	....	......	12	4,179	27	34,171	..	.....
Greek	....	......	297	84,241	8	4,585	..	.....
Austrian	....	......	27	8,216	7	7,691	..	.....
Danish	....	......	8	574	6	3,720	..	.....
Portuguese	....	......	5	533	....	....	1	541
South Am.	....	......	25	10,332	13	7,097	2	341
Turkish	62	7,885	.....	....	....	....	.	.....
Central Am.	....	......	35	9,279	....	....	4	4,425
Asiatic	2	2,212	.....	....	4	1,403	..	.....
Belgian	4	1,810	.....	....	13	17,246	..	.....
Roumanian	4	664	.....	....	....	....	..	.....
Total	221	64,047	1,186	505,638	932	749,910	7	5,307

RECAPITULATION.

	Sailing vessels. No.	Tons.	Steamers. No.	Tons.
Increase	221	64,047	932	749,910
Decrease	1,186	505,638	7	5,307
Decrease	965	441,581	Inc. 925	744,603

The increase in sailing vessels under the German and Russian flags is due in part to transfers from the Peruvian flag to these nationalities while the war on the Pacific lasts, and in part to some sailing vessels having been built and bought by Bremen merchants for the increasing petroleum trade. The Turkish increase under the same head is owing to re-transfer of vessels which had temporarily quitted the Turkish flag while the Turks were at war with Russia and her allies. Many of these vessels, if not most of them, sought shelter under the Greek flag, which explains to some extent the decrease of the latter during the past two years.

The general increase of steamers will be noticed. Since 1870 the increase in steamers has been 22½ per cent. under the British flag, 25 per cent. under the French, 27 per cent. under the Norwegian, and 17½ per cent. under the German flag. Most of these steamers have been built in England, but in Germany and France a good many large steamers have been constructed and fitted out during the last few years. In the German yards there are now nearly all the time some twenty iron steamers building, some of them of 2500 tons measurement, for the transatlantic trade.

In France the building and buying of steamers is likely to receive a great impulse, in consequence of the premium which the government allows henceforward. In Italy there are some facilities for building them, but there is a lack of capital, and, besides, Italy has no coal of her own, which is a great drawback.

The next few years are likely to exhibit some further great changes in the sense indicated by the above statistics.

The world's mercantile steam fleet is at present the following:

Flag.	Steamers.	Tonnage. Gross.	Net.
British	3,787	4,265,619	2,773,082
American	548	634,292	389,937
French	335	423,787	277,781
German	277	289,429	203,322
Spanish	266	205,498	135,874
Russian	166	128,729	82,834
Dutch	113	118,260	80,632
Italian	103	107,070	72,813
Swedish	258	98,969	69,292
Austrian	82	93,142	62,114
Danish	109	74,987	47,844
Norwegian	148	67,630	49,007
Belgian	40	64,773	44,747
South American	87	61,198	40,401
Asiatic	33	38,984	24,210
Egyptian	18	18,212	11,859
Portuguese	17	16,253	10,947
Greek	20	14,237	9,526
Turkish	10	8,866	5,579
Central American	10	4,572	3,802
Tunisian	1	1,067	726
Roumanian	1	166	111
Sundry nations	5	9,552	6,302
Total	6,434	6,745,198	4,407,742

Patents and Improvements.

A good many manufacturers live in a state of perpetual trouble and anxiety with regard to their patents and their liability to the owners of other patents. Naturally, we are in receipt of frequent letters asking for information and advice in patent matters, and as we are rarely able to give the former and never the latter, we cannot use a portion of our space more profitably than in giving those of our readers for whom the subject has interest, such general information with regard to the elementary principles of patent law as will enable them to discover that it is not at all mysterious, but rests upon a broad basis of equity. For anything more than this they would do well to consult counsel.

It is an infringement of a patent to either make, or sell, or use, without legal permit, anything which forms the subject matter of any claim or clause of claim in a valid patent.

The intent to infringe is not necessary, and the patentee need not notify an infringer before bringing suit.

A mere workman for the real party in interest is not an infringer, but if one party were to hire another to make or use patented things, both would be held infringers.

The sale of the materials for making a patented invention, as such, and with no license, expressed or implied, to use the invention, is not an infringement.

In proceeding to determine whether a certain article is an infringement of a patent, it must be compared separately with each clause of claim in the patent; for, if any clause of the claim is infringed, the patent is infringed. The claim is the vital part of a patent, and no matter whether the actual invention be greater or less, the question of infringement is to be determined upon the claim; for a patentee must stand or fall by the claim he makes.

The thing described and claimed in the patent and another thing are held to be substantially identical if the same result is attained by the same or equivalent means.

A claim is generally, if not always, for a specific thing, or for a combination of different elements; and, having determined which the claim is for, it must then be determined whether the thing to be compared with the patent has all the parts or qualities which the claim makes essential; and, if such thing have not all these parts, then it does not infringe. Form, size and material are not generally essentials, but they may be. In any case, it matters not what names are given to parts of a device: the real question is: Do the parts compared perform the same office in substantially the same way?

It is not an infringement of a claim for a combination to make or use or sell any of the elements of the combination less than the whole, but additions to a combination will not avoid an infringement, and a man cannot use another's patented invention simply because he has made an improvement upon it. That a device works better or worse than the patented device, is not generally decisive of substantial difference.

If a specific thing is claimed, or if an element of a combination is in a new field of invention, and is the first of its kind, a court will give the doctrine of equivalents its broadest application as related to such new thing; but if the specific thing, or the element of a combination, is itself new only in degree—an improvement upon some prior existing thing for the same purpose—then the court will hold only those things substantially identical therewith which are mere colorable evasions or obvious substitutes therefor.

To constitute an infringement, it is not always necessary that a person should technically infringe the claim. Where a party had a patent for a combination of a lamp burner and a lamp chimney, and another party made and sold only the burner, the judge held such makers of the burners infringers; and where one party had a patent on a cartridge, and another party made and sold guns designed for firing this cartridge, the gunmaker was held an infringer. In these and similar cases the intent is of importance.

Suits for infringement can be brought only in the name of the owner or owners of the patent right for the district or territory where the infringement is committed. Assignees of the whole patent, or grantees of particular districts, may bring suit in their own names, but licensees cannot. The licenser is the proper person to bring suit for injury, in the nature of infringement, to the rights of the licensee.

Suits for infringement may be either on the case at law or by a bill of complaint in equity. If the suit be brought to the equity side of the court, the complainant may, if he be entitled, get a preliminary or provisional injunction upon a mere motion. He is not compelled to go into the question of the amount of damages until the court has settled the question of the validity of the patent and the question of infringement; and a perpetual injunction issues against the defendant, as a matter of course, upon a finding by the court that the patent is valid and has been infringed. In suits at law, injunctions must be had by separate process, and in the trial of the case is involved the question of damages.

All suits for infringement of patents must be brought in United States courts.

Two things must concur to give a United States court jurisdiction—the offense of infringement must be committed and the process served upon the infringer within the territorial limits of the district in which the court has jurisdiction.

When in the course of an equity suit, the court, on final hearing upon pleadings and proofs, finds that the patent is valid and that it has been infringed, the court grants, as a matter of course, a perpetual injunction against the infringer, and, if the party thus enjoined further infringes in defiance of such injunction, he can be committed to jail for contempt of court. The same kind of injunction will be issued by the equity side of a court when a like finding has been made in a suit at law.

Provisional injunctions are asked for at the commencement or during the progress of a suit, with the intent that the defendant may be restrained from infringing until the plaintiff's right to a perpetual injunction is determined. Courts will not, as a general rule, however, grant a provisional injunction, unless there has been some previous adjudication sustaining the patent, where the same points of validity and infringement were in issue, or unless there has been a long and undisputed enjoyment of the patent privilege, and the plaintiff is able to make it appear that the defendant's device and his own are substantially identical.

Where a provisional injunction would operate unjustly upon the defendant, or where it would cause him irreparable injury, while the plaintiff could have ample satisfaction in money damages, the provisional injunction will be refused.

Where the plaintiffs are in the habit of granting licenses under their patent, the court will sometimes refuse a provisional injunction, unless defendants refuse to take and pay for a license.

The court will sometimes order that the defendants keep an account of profits and give bond for payment of damages pending the continuance of the suit. If the plaintiff is in the habit of granting licenses, relying wholly or mainly upon them to make the patent profitable, then the usual price of such a license will be taken as the damages to be found. In other cases the rule is to give the plaintiff such damages as will fully remunerate him for the loss caused him by the infringer. If the plaintiff's actual loss be greater than the defendant's profits, the plaintiff may collect as damages such excess of loss, together with the defendant's profits. In an accounting before a master-in-chancery, the defendant is compelled to disclose what his actual profits have been. The defeated party in a suit has to pay the legal costs, but counsel fees are not included therein.

In any action for infringement the defendant may plead the general issue, and, having given notice in writing to the plaintiff or his attorney 30 days before, may prove on trial any one or more of the following special matters:

1. That for the purpose of deceiving the public, the description and specification was made to contain less than the whole truth relative to the invention, or more than is necessary to produce the desired effect.
2. Prior invention.
3. Prior publication.
4. Prior use.
5. Public use for more than two years prior to application, or abandonment to the public.

The defendant may also charge that the specification is uncertain and ambiguous in the description of the claim, that a combination is a mere aggregation, that the plaintiff is not the legal owner of the patent, that the plaintiff has unreasonably delayed to file a disclaimer, or that there is a total lack of utility in the alleged invention. There are other special defenses.

It is for the court to say what the patentee claims and what he does not claim; whether there is ambiguity in the claim; whether or not two patents claim the same thing; whether the actual invention claimed is of a kind to be patentable, as a machine; and also whether the invention has statutory utility—that is any utility, in contradistinction from being frivolous, or insignificant, or pernicious in its purpose.

We believe this a fair and correct synopsis of the law defining the nature of infringements, the rights of patentees as against infringers, and the legal proceedings by which the rights of patentees are defended.

The early completion of the railway system which is to bring Arizona and New Mexico into closer connection with the East, appears likely to introduce new and vigorous competitors into our copper markets. Both of the territories are known to possess very extensive and rich deposits of copper ore, which are now attracting capital from the East as well as from the Pacific slope. A determined effort will probably be made to render this mineral region productive. Judging from the reports received, even after making an allowance for the enthusiasm of promoters and prospectors, there is good reason to believe that the output of the new copper districts will make itself felt in our markets at an early date. The surface ores, principally oxides and carbonates, are reduced with ease by a simple smelting process. Until now, excessive freights for fuel and product, and high rates of labor, have stood in the way of any development. This state of affairs is not likely to continue long; in fact, actual work has begun, and we are assured that even during the present year a production estimated at from five to eight millions of pounds of copper will be reached, the entire output being that of the last few months. As yet the copper must be sent to San Francisco and shipped to market around the Horn or *via* Panama, to be refined here; but this question of transportation will soon be satisfactorily solved. How far the known presence of silver and gold in the ores will affect the returns cannot yet be said, as developments are not sufficiently well advanced. Should it be possible, as there are some indications, to extract even small amounts of the precious metals with profit, there will be placed in the hands of Arizona producers an additional means of meeting low prices and making concessions for inferiority of quality, as it is not claimed that the copper produced by elaborate smelting and refining processes will grade as high as the virgin metal from Lake Superior.

The boot and shoe manufacturers appear to be determined to test the legality of the patents held by Mr. Gordon McKay on sewing machinery. They organized recently at Philadelphia, and had an interview with the inventor, whose principal patent expires at an early date, but who insists upon claiming royalties in the future for a number of improvements. During the discussion of the subject a matter was brought up which is of interest generally to both inventors and manufacturers. The McKay Sewing Machine Company manufacture their patented machines and sell them to shoe manufacturers in this country at a specified price. In Canada, however, they place them on the market at considerably lower figures, thus discriminating against American manufacturers. This course they are forced to adopt in order to compete with rival sewing machine manufacturers in Canada, against whose imitations they have no other remedy than sharp underselling, because the McKay sewing machine is not patented in the Dominion. No one will deny their right to shape their business policy in this way under the existing circumstances, but the case clearly reveals the possibility of a state of affairs which may prove very awkward both to an inventor and to his licensees. The neglect to secure patent rights in Canada may lead to a loss of a good market in that country, and may even invite successful competition from the manufacturers of that quarter, owing to their being exempt from license fees, which are often excessive. In such cases American makers will justly claim concessions which they would not otherwise have asked for, and the benefits of an American inventor may thus be considerably reduced. In justice to his licensees, and for the sake of his own interests, he is bound to do his utmost to secure protection in that quarter.

The Chief of the Bureau of Statistics furnishes the following information in regard to immigration into the United States: There arrived in the Customs districts of Baltimore, Boston, Detroit, Huron, Minnesota, New Bedford, New Orleans, New York, Passamaquoddy, Philadelphia and San Francisco during the month ended October 31, 1880, 69,808 passengers, of whom 61,312 were immigrants, 5905 citizens of the United States returned from abroad, and 2591 aliens not intending to reside in the United States. Of this total number of immigrants there arrived from England 6665; Wales, 110; Scotland, 1388; Ireland, 5705; Germany, 17,059; Austria, 1555; Sweden, 3486; Norway, 1453; Denmark, 950; France, 551; Switzerland, 922; Spain, 79; Holland, 230; Belgium, 141; Italy, 1051; Russia, 352; Poland, 184; Hungary, 481; Finland, 14; Dominion of Canada, 17,517; China, 474; Australasia, 81; Mexico, 33; Portugal, 82; Azores, 79; and from all other countries 70.

To judge from the action of two distinct bodies which held meetings recently at St. Louis and New Orleans, respectively, it is certain that something should be done to improve the navigation of the Mississippi River and its principal tributaries. The only question now appears to be by whom it shall be done. The first great step has been accomplished by the successful creation of a deep channel through the South Pass by the Eads jetty system. Two conventions now urge that the good work thus begun be prosecuted with

energy by the government. There is now pending before Congress a bill providing for such work, based upon the report and specifications of a commission of engineers and experts. This bill should receive prompt and careful consideration, as it involves large and important interests. With an additional and cheap outlet to sea, the prosperity of the Mississippi Valley States, and with them that of the whole country, would receive strong and lasting impetus.

Probably the change in the weather within the past few days will have a beneficial effect upon general trade. An early frost quickens distribution in nearly all lines of trade. There is nothing unseasonable in a cold wave in the last half of November, but when warm weather lasts until December, as it sometimes does, trade is more or less congested, and the later distribution never quite compensates for the loss of impetus at the outset.

SCIENTIFIC AND TECHNICAL.

Prof. S. P. Langley, of Allegheny, has devised an instrument which will probably prove a useful one for the physicist and astronomer.

THE THERMAL BALANCE,

as he calls it, is intended to serve for delicate investigations of radial heat. Melloni's thermopile, although known for upward of 50 years, has been little improved, and is unfit for solving such problems as the measurement of the distribution of radiant energy in a pure spectrum when the rays have not passed through any prism. No accurate results could be obtained by Prof. Langley with the thermopile. He was forced to invent a more sensitive instrument for this special investigation, and, having done so, he believed it would be of general utility. The principle of the new apparatus has been applied by Dr. Siemens and others to other purposes. Prof. Langley spent several months in making it, as he hoped, a useful working tool for the physicist and the physical astronomer. It is founded on the principle that if a wire conveying an electric current be heated, less electricity flows through it than before. If two such wires, carrying equal currents from a powerful battery, meet in a recording apparatus (the galvanometer), the index of the instrument—pushed in two ways by exactly opposite forces—will remain at rest. If one current be diminished by warming ever so little the wire which conveys it, the other current gets the upper hand and the index swings with a force due, not directly to the feeble heat which warmed the wire, but to the power of the battery which this feeble heat controls. The application of this principle is thus made: Iron or steel is rolled into sheets of extreme thinness, like those of steel made at the works of Miller & Parkin, Pittsburgh, Pa., of which it took 8000 to make the thickness of an inch. Of platinum sheets rolled at the Philadelphia mint, 50 laid one on another did not, together, equal the thickness of light tissue paper. Minute strips, one-thirty second of an inch wide and one-quarter of an inch long, cut from this were united so as to form a prominent part of the circuit, through which a current of a powerful battery passed to the galvanometer. Experiment proved that an almost inconceivably minute warming of a set of these strips would reduce the passage of the electricity so as to produce very large indications on the registering instrument. Prof. Langley had, in the course of his experiments, thus far, he said, found iron the most advantageous, though other metals were still under trial. The instrument thus formed was from ten to thirty times more sensitive than the most delicate thermopile; but this was almost a secondary advantage compared with its great precision and the readiness with which it is used. The thermopile is very slow in its action. This new instrument, the thermal-balance, takes up the heat and parts with it again in a single second. It is almost as prompt as the human eye itself. To show its accuracy, Prof. Langley gave experiments which proved that the probable error of a single measurement made with the instrument could be reduced within 1 per cent. of the amount to be measured. To show its sensitiveness the statement was made that it would register a change in the temperature of the iron strips, just described, which did not exceed 150,000 part of a Fahrenheit degree. When mounted in a reflecting telescope it would record the heat of a man or other animal in a distant field. It would do this equally well in the night, and might be said, in a certain sense, to give the power of seeing in the dark. A more valuable proof of its efficiency was shown in a series of measurements of the heat of the moon, made under varied circumstances, to guard against error, but each made in a few seconds. All agreed in showing that the almost immeasurably minute amount of heat from the moon could be certainly measured by it, even with a common refracting telescope.

Prof. Silliman has called attention to

THE TURQUOISE OF NEW MEXICO,

and the circumstances which point to its origin. The turquoise mines of New Mexico are found at Mt. Chalchuitl, in Los Cerillos, about 22 miles southwest of the ancient town of Santa Fe. The rocks which form Mt. Calchuitl—the Indian name of the turquoise—are distinguished from those of the surrounding and associated ranges of the Cerillos by their white color and decomposed appearance, closely resembling tuff and kaolin, and giving evidence of an extensive and profound alteration, due, probably, to the escape through them, at this point, of heated vapor of water, and perhaps of other vapors or gases, by the action of which the original crystalline structure of the mass has been completely decomposed or metamorphosed, with the production of new chemical compounds. Among these the turquoise is the most conspicuous and important. In the seams and cavities of this yellowish-white and kaolin-like tuffaceous rock the turquoise is found in thin veinlets and little balls or concretions called "nuggets," covered on the exterior with a crust of the nearly white tuff, and showing on cross fracture the less valued varieties of the gem, more rarely offering fine sky-blue stones of higher value for ornamental purposes. It is easy to see these blue stains in every direction among these decomposed rocks, but the turquoise in masses of any commercial value is extremely rare, and many tons of the rock may be broken without finding a single stone which a jeweler or virtuoso would value as a gem. The origin of the turquoise of Los Cerillos, in view of late observations, is not doubtful. Chemically, it is a hydrous aluminum phosphate. Its blue color is due to a variable quantity of copper oxide derived from associated rocks. The Cerillos turquoise contains 3.81 per cent. of this metal. Neglecting this constituent the formula for turquoise requires: Phosphoric acid, 32.6; alumina, 47.0; water, 20.5; total, 100.1. Evidently the decomposition of the feldspar of the trachyte has furnished the alumina, while the phosphate of lime, which the microscope detects in the thin sections of the Cerillos rocks, has furnished the phosphoric acid. A little copper is diffused as a constituent also of the veins of this region, and hence the color which the metal imparts. The inspection of thin sections of the turquoise by the microscope with a high power, shows the seemingly homogeneous mass of this compact and noncrystalline mineral to consist of very minute scales, nearly colorless, and having an aggregate polarization, and showing a few particles of iron oxide. The rocks in which the turquoise occurs are seen by the aid of the microscope and polarized light in thin section to be plainly only the ruins, as it were, of crystalline trachytes showing remnants of feldspar crystals, decomposed in part into a white kaolin-like substance, with mica and glassy grains, quartz, with large fluidal inclosures, looking like a secondary product. There is a considerable diversity in their looks, but they may all be classed as trachyte-tuffs, and are doubtless merely the result of the crystalline rocks of the district along the line of volcanic fissures.

At a meeting of the National Academy of Sciences in this city, Prof. Agassiz read a paper

ON THE ORIGIN OF THE CORAL REEFS OF THE YUCATAN AND FLORIDA BANKS.

He said Darwin tried to show that the production of atolls is to be ascribed to the subsidence by slow degrees of the foundations on which they rest. This theory did not hold good with regard to the coral reefs and atolls to be met with on the eastern slope of the Windward Islands, to the north of Santo Domingo, and the southern coast of Cuba, south of Florida and in an easterly direction from Yucatan. In order to clearly understand how a submarine plateau can be built up sufficiently near the surface to form a foundation on which reef-forming corals might live, it is necessary to pay attention to the various organisms which live from the surface down to about 100 fathoms. In calm weather they swarm near the surface, but when it is rough they are to be found several fathoms beneath the waves. They are borne along by the great oceanic currents which are created by the winds, and supply the corals on the outer edge of the reefs with abundant food. When these surface animals die, either by coming in contact with colder water or from other causes, their shells and skeletons fall to the bottom, and carry down with them some organic matter which gives a supply of food to deep sea animals. The great equatorial currents find their way through the numerous loopholes in the Windward Islands, and carry with them the greater portion of this Pelagic food. Upon entering the Caribbean Sea, the Gulf Stream takes up these varieties of Pelagic foraminifera and deposits them in the places where the Yucatan and Florida Banks are to be found. In shallower depths, as in this case on the top of submarine elevations or volcanic formations, the accumulations of dead siliceous shells is very rapid. The action of sea water has scarcely any checking effect. The growth of these deposits, favored by the presence of carbonate of lime in ocean water and its consequent reduction to bicarbonate by carbonic acid, eventually reaches that hight at which coral reefs may exist. All the soundings made of late in these latitudes tend to confirm this view. On the other hand, it would be difficult to conceive how these submerged banks could have been produced by subsidence, situated as they are in relation to each other. It is a much more natural view to regard these atolls and submerged banks as originally volcanoes reaching to various hights beneath the sea, and which have subsequently been built up to and toward the surface by accumulations of organic sediment and the growth of coral on their summits.

Lieutenant Schwatka, the Arctic explorer, gives some interesting facts about

THE DURATION OF ARCTIC WINTER.

The generally received opinion that the Arctic winter, especially in the higher latitudes, is a long, dreary one of perfect opaque darkness, is not strictly correct. In latitude 83° 20' 20" N., the highest point ever reached by man, there are 4 hours and 42 minutes of twilight on December 22, the shortest day in the year in the Northern Hemisphere. In latitude 82° 27' N., the highest point where white men have wintered, there are 6 hours and 2 minutes in the shortest day, and 328 geographical miles from that point must yet be attained before the true Plutonic zone, or that one in which there is no twilight whatsoever, even upon the shortest day of the year, can be said to have been entered by man. Of course, about the beginning and ending of this twilight, it is very feeble and easily extinguished by even the slightest mists; but, nevertheless, it exists, and is quite appreciable on clear, cold days, or nights, properly speaking. The North Pole itself is only shrouded in perfect blackness from November 13 to January 29, a period of 77 days. Supposing that the sun has set (supposing a circumpolar sea or body of water unlimited to vision) on September 24, not to rise until March 18 for that particular point, giving a period of about 50 days of uniformly varying twilight, the Pole has about 188 days of continuous daylight, 100 days of varying twilight and 77 of perfect inky darkness (save when the moon has a northern declination) in the period of a typical year. During the period of a little over four days the sun shines continuously on both the North and South Poles at the same time, owing to refraction parallax, semi-diameter and dip of the horizon.

Prof. Emerson Reynolds describes a process for

THE PROTECTION OF LEAD AGAINST CORROSION,

by coating it with a film of sulphide of lead. He recommends the following method: Take 16 grams of solid caustic soda, dissolve it in 1.75 liters of water, and add to the liquid 17 grams of nitrate of lead, or an equivalent of other lead salt, with 250 cubic centimeters of water; raise the temperature of the mixture to 90° C. If sufficient lead salt has been added the liquid will remain somewhat turbid after heating, and must then be rapidly strained or filtered through asbestos, glass-wool, or other suitable material, into a convenient vessel. The filtered liquid is then well mixed with 100 cubic centimeters of hot water, containing in solution 4 grams of sulpho urea or thio-carbamide. If the temperature of the mixture be maintained at about 70° C., deposition of sulphide of lead or galena, in the form of a fine adherent film or layer, quickly takes place on any object immersed in or covered with the liquid, provided the object be in a perfectly clean condition and suitable for the purpose. When the operation is properly conducted a layer of galena is obtained which is so strongly adherent that it can be easily polished by means of the usual leather polisher. It is not necessary to deposit the galena from hot liquids, but the deposition is more rapid than from cold solutions.

Railway Equipment Manufactured in 1880.

The wonderful activity in the construction of new railways, and the great increase of the business of those already in operation, during the present year, have been impressed upon the notice of every observer. The manufacturers of locomotives, cars, rails and all forms of railway supplies have been, and are still, unable to keep up with the demand, although they have made large additions to their facilities, and in many cases have been obliged to decline orders. Very few persons have any idea of the enormous contribution to the manufacturing industry of the country made by railway companies for their equipment alone—how many tens of thousands of men are employed in constructing additional locomotives and cars, to say nothing of the work of repairing constantly going on, nor how many millions of dollars are scattered by these same great money distributors among the manufactories. Probably most people know that a very large portion of every railway company's expenditures is for the payment of the employees who conduct its operations, but few consider what an enormous contributor to the manufacturing institutions whose varied products are used in the construction and furnishing of rolling stock every railway is.

In order to obtain some data in regard to this subject we caused to be addressed to the different railway companies a printed blank requesting information as to the number of locomotives and cars of all kinds built or purchased by them since January 1, 1880; and also as to the additional number of each which it was expected to order during the present year. Inquiry was also made as to the amount of steel and iron rails and number of ties used. These inquiries, evidently, were somewhat troublesome to answer, and it was not expected that all of the companies would respond. Thus far replies have been received from 64 companies, including some of the largest and some of the smallest from every part of the country, and representing about 21 per cent. of the total mileage, and from these we have tabulated the following surprising figures: In estimating the values we have rated locomotives at $8500; passenger cars at $4000; sleeping cars at $11,000; baggage and mail cars at $2800; box cars at $500; flat cars at $375; coal cars at $300—allowing for both large and small—and stock cars at $525; which will, we think, be considered reasonable. We thus obtain the following, for the period since the 1st of January last:

ADDITIONS REPORTED BY 64 COMPANIES

	No.	Estimated value.
Locomotives	335	$2,847,500
Passenger coaches	271	$1,084,000
Sleeping cars	24	264,000
Baggage and mail cars	86	240,800
Box cars	10,266	5,133,000
Stock cars	965	506,625
Flat cars	4,457	1,448,525
Coal cars	7,107	2,132,100
Total cars	24,175	$10,809,050
Add value locomotives		2,847,500
Total value rolling stock		$13,656,550

Here we have, therefore, over $13,600,000 already expended this year by these 64 companies for rolling stock alone. As showing that this is by no means the whole of their year's expenditure in this direction, we add their own estimates of further orders during 1880, footing as follows:

EXPECTED TO BE ADDED IN 1880.

	No.	Value.
Locomotives	103	$875,500
Passenger cars	24	$96,000
Baggage and mail cars	11	30,800
Box cars	3,165	1,582,500
Flat cars	657	246,375
Coal cars	2,706	811,800
Stock cars	30	15,750
Total cars	6,593	$2,783,225
Add value locomotives		875,500
Total value		$3,658,725

If these intended additions are all made, it will swell the year's outlay for rolling stock by these companies to some $17,300,000.

Now, the aggregate mileage of the 64 companies reported is 19,197 miles, probably about 21 per cent. of the present actual railway mileage of the country. While, of course, any figures based upon these can only be approximately correct for the whole railway system, yet it will be allowable to use them in a rough estimate. Taking, therefore, the figures in the first table as representing 21 per cent. of the whole, we make the following grand total:

ESTIMATED ADDITIONS BY ALL COMPANIES AT SAME RATE AS ABOVE.

	No.	Estimated value.
Locomotives	1,595	$13,472,000
Passenger coaches	1,290	$5,805,000
Sleeping cars	114	1,254,000
Baggage and mail cars	409	1,145,200
Box cars	46,980	23,490,000
Stock cars	4,595	2,412,375
Flat cars	21,223	7,958,645
Coal cars	33,809	10,142,700
Total cars	68,420	$52,207,920
Add value locomotives		13,472,000
Estimated total value of rolling stock		$65,679,920

These figures appear almost incredible. It is hard to believe that nearly 1600 locomotives and over 68,000 cars of all kinds, valued at over $65,600,000, have already been added by our railways this year, making no account of the additions yet to be made in the proportion suggested by the second table of estimated additions, and yet we believe that these figures are not very far out of the way.

We now take the figures reported to us by the 64 roads, showing the amount of rails and number of ties laid since January 1. The price last January of steel rails was about $70, and of iron rails about $55 per ton. The present prices are $60 and $47 respectively. Rail was, of course, bought previous to 1880 for much less than these figures, but it was also largely used up in that year, and the rail mills have certainly had enough to do at existing prices. It is perhaps fair, therefore, to figure steel at $60 and iron at $45, and we have the following figures:

RAILS AND TIES LAID SINCE JANUARY 1 BY 64 ROADS.

	Miles.	Tons.	Value.
Steel rails	1,770	156,306	$9,378,360
Iron rails	673	48,662	2,189,790
Ties, number	8,560,728		8,424,290
Total value			$14,992,440

The same companies estimate that during the remainder of the year they will probably lay 568 miles, or 52,926 tons of steel rails, 159 miles, or 12,612 tons of iron rails, and 1,625,000 ties. Estimating the cost of the steel rails at $3,175,500, of the iron rails at $567,500, and the ties at $650,000, we have a total of $4,393,000 more, which would make the outlay of these roads for rails and ties for the year over $19,000,000. But if, taking the purchases actually reported by the 64 roads, we may assume that the same proportion to mileage will hold good throughout the country, we have the following:

ESTIMATE OF RAILS AND TIES LAID BY ALL ROADS SINCE JAN. 1.

	Miles.	Tons.	Value.
Steel rails	8,429	744,310	$44,658,600
Iron rails	3,205	231,720	10,427,500
Ties, number	40,765,000		16,060,000
Total estimated value			$71,146,100.

As the mileage of new roads thus far reported as laid since Jan. 1 is not more than 5000 miles, the number of miles of rails above given looks excessive. It probably is too large, as the roads not reporting very likely did not use as much in proportion as those sending returns. At the same time it must be remembered that an immense quantity of rails has been used for renewals and for side tracks and second tracks, so that the road mileage constructed is not by any means the measure of the amount of rail consumption.

On the whole, these figures, although claiming the dignity of statistics only so far as they apply to the companies actually reporting, are, we think, highly interesting as showing a much larger contribution by our railway companies to the prosperity of our manufactures, and hence of every interest, than has been generally believed. If the railways feel sufficient interest in obtaining more exact figures to send in a general response to the inquiries made, we shall be glad to summarize the results again.—*Railway Age.*

Heating Cars by Heat Developed from Friction.

Prof. Webster Wells, late of the Massachusetts Institute of Technology, has invented a new and rather remarkable apparatus for heating cars. The *Economist* says of it:

The principle of this machine is friction, and the simplicity of construction and adaptability to every place where waste power can be utilized, are as wonderful as are the results accomplished. No one can see it in operation without feeling that this is one of the very few great inventions of the age, and that it places Prof. Wells in the very front rank of inventors. It consists only of an iron cylinder, 2 feet long and 1 foot in diameter, having a fixed plate of hardened iron in one end, and a second plate, attached to a revolving shaft, which presses lightly or closely upon the fixed plate, as circumstances require. The cylinder is filled with water, the shaft revolves, and from the friction of the plates the water, in an incredibly short time, is heated, and by means of steam pipes can be carried to great distances for heating purposes.

The construction of the machine is such that it is easily adapted to every place where there is waste power, as in mills, factories, public buildings and cars. In fact, in every place where any power is used, the machine can be applied, since the power required for its operation is so slight as to be of almost no account. Thus, to carry a machine with 36 square inches of friction plates, the ordinary size, ½-horse power only is required, while a machine with 225 square inches of friction surface will require at most but 4-horse power, and will heat a room 60 x 200, or 126,000 cubic feet. In steam cars the machine is easily and cheaply adjusted to the axles, the power being taken directly from the wheels, so that in case of accident, such as started the train of thought which resulted in this invention, all danger from fire is entirely eliminated.

The machine has already been in practical operation for some months, and has demonstrated that with 36 inches of friction surface a room of 10,000 cubic feet can be heated more uniformly and quicker than by the use of coal, wood or steam, and absolutely without expense save the wear of the friction plates and the pittance for extra coal under the boiler. Indeed, for simplicity of construction, for adaptability to every place where waste power may be utilized, and for the results attained, the machine is a marvel. It has been visited by hundreds of well-known engineers, mechanics, railway and mill superintendents, and all unhesitatingly pronounce it a great and valuable invention. Mr. N. W. Churchill, a well-known business man and an intimate friend of Prof. Wells, is manager of the company organized for the introduction of this heater, and at present has his headquarters at 178 Devonshire street, Boston, where any one who desires to see in practical operation a machine which will produce heat without fuel or fire will find pleasant employment for a half hour of leisure.

Burning Collieries in the Anthracite Regions.

The Keeley Run Colliery, in which fire was discovered early in August of this year, still continues to burn. The attempt to put it out with the aid of carbonic acid gas was abandoned on the 18th ult.

The mine now on fire is divided into three lifts, an upper water level, and two lower levels, the whole depth being 225 yards from the surface. The fire, which broke out in two old breasts in the upper level, it is supposed has been smouldering among the coal dust for several months, and from there extended to the second level, where the vein of coal is from 45 to 50 feet in width, at an angle of 45 degrees. While the attempts were being made to stop the fire with gas, workmen were engaged in putting in batteries and clay stoppings to prevent the spread of the flames and to allow of water being introduced.

It is proposed to raise the water to the hight of 35 feet, but this would not extinguish the fire, as the vein is nearly 50 feet thick, but it would save a large quantity of coal. In the judgment of A. B. Cochran and John R. Hoffman, mining engineers, and Samuel Gay, mining inspector, appointed by the court to examine the mine, the only effective plan that can be adopted to extinguish the fire is to flood the mine. This, they say, can only be done by cutting off all connections between the Keeley colliery and the Kohinoor shaft, for the reason that the top of the Kohinoor shaft is about 160 feet lower than the top of the Keeley run slope, and the water would not rise to a sufficient hight to flood the colliery before it would run out of the mouth of the Kohinoor or Heckscher shaft. They express the opinion that dams may be built on the first and second lifts sufficiently strong to retain the water to flood the colliery and to extinguish the fire. These dams would be built in the gangways on the western end of the lease, near the Kohinoor workings, and would have to be put in by sinking a slope from the surface.

It is thought by others, says a correspondent of the *Public Ledger*, that the mine cannot be flooded so as to extinguish all the fire, for the reason that the battery or stopings already erected in the new slope which leads to the lower lift and connects with the Kohinoor Colliery, will not be strong enough to hold sufficient water to put out all the fire. It is therefore proposed to cut the coal out from each end of the fire and fill in with gravel and then let the center piece burn out. If this work is commenced it will require several months, as they would have to cut from the surface down to the water, a distance of about 100 yards. It is very important that the progress of this fire should be stopped as soon as possible, as, in addition to its connection with the Kohinoor on the west, there are other collieries which would in time be effected.

The difficulties encountered in extinguishing fires in coal mines are evidenced by the fire now burning in what was known as the Greenwood Colliery, near Tamaqua. This mine, in almost every extent, is like the Keeley Run Colliery in its situation and in its interior condition. The fire, which is still burning in the Greenwood Colliery, broke out over 25 years ago, after the colliery had been worked for about 20 years. The vein was 27 feet thick.

Mr. Robert Carter, now in charge of the Keeley Run Colliery, at Shenandoah, was the Superintendent of the Greenwood Colliery at the time when the fire occurred. He states that the fire started in an old opening or breach upon the surface. Men who were getting coal from this opening in cold weather left, it is supposed, fire in the place where they were working, and thus igniting the coal on the surface it worked its way down an old shaft, though slowly, to the water level vein, and from thence to the next level, 300 feet below, but work was continued until this point was reached. After the flames had reached the lower level, the men had to leave the mine, and measures were taken to subdue the fire.

The notion that carbonic acid gas would be effective prevailed, and experiments for this purpose were made by a Scotchman named Mingee. A large amount of money was expended in this way during the two years that the experiments continued, but the fire gained headway slowly, and even extended to the lowest level of the workings, a distance of 750 feet below the surface. The proprietors of the mine, finding that the gas forced in failed to have the desired effect, determined to flood the lower level. This was accomplished, but, of course, the upper level, 300 feet below the surface, continued to burn. At the same time a cross section was cut in the upper vein and filled with gravel so as to prevent the spread of the flames to other coal properties. There is no telling when the mine will be worked again, or when the fire will be extinguished. The smoke from it is still plainly visible, particularly at night.

A company has been formed in Paris to work an invention for coating thread with silk. The invention embraces, according to the *Bulletin des Soies*, a chemical process for covering linen or other vegetable threads with a mesh of silken matter in a way similar to that in which metallic objects are plated with gold or silver. The process is dependent on the fact, which has long been known, that silk is soluble in several strong acid preparations.

A Philadelphia and New York Freight Line.

The *North American* says: The project of organizing a new transportation line *via* canal between this city and New York is rapidly progressing. It is led by Jacob Lorillard. The company will be called the New York and Philadelphia Insured Mutual Freight Line. The capital has been placed at $500,000, limited liability, in $100 shares. Of this amount it is proposed by Lorillard to take $125,000, leaving $125,000 each to New York and Philadelphia merchants. William Sperry, of 400 Locust street, has been selected as the agent of the company in this city, and is now receiving subscriptions. In setting forth the prospectus of the company, Mr. Lorillard says that the large transportation business existing between the two cities, consisting of so many invoices that are totally uninsured and subject the owners to marine and other risks by loss, have induced him to propose a remedy that will be profitable to the projectors and a saving to the shippers, as well, also as a much-needed accommodation. He states that he is prepared to build two first-class very fast (16 knot) steamers of steel or iron of about 1500 tons, adapted especially to the requirements of the business. It is proposed that the steamers will be ready in May or June, and the terminal facilities both in New York and Philadelphia have already been secured. The annual net profits are estimated at $530,400, and none but shippers will be allowed to subscribe to the stock. The lower hold of the steamers will be divided into many water-tight compartments, making a vessel that will be unsinkable, and thereby enabling the company to issue an insured bill of lading at rates below the present tariff. The vessels will leave each end of the route at 5 p. m. daily, delivering their cargo next forenoon (15 hours), carrying all the cargo in the between decks, where it can be carefully handled and at least expense. To unite mutually the interests of the company and that of its patrons, and thereby insure a certainty of success from the beginning, it is proposed allotting one-half of the stock to not less than 50 prominent shippers, so that they may participate in the profits made from the transportation of their own goods and be privileged shippers by the line. This line can be run at rates of freight, it is claimed, far below the possibility of railroad competition. The estimate is for 800 tons daily (both ways) of the 2500 tons daily that now are handled between the cities, being but one-third capacity of vessels.

Mr. Chas. G. Lundell, of Boston, advises us that he is in receipt of telegraphic advices from Sweden, stating that the price of charcoal is advancing in that country. This will have a tendency to further strengthen the Swedish iron market, which has been stiffening in a marked degree for some two or three weeks past.

Sir Thomas Bouch, the prominent engineer who designed the ill-fated Tay Bridge and elaborated plans for bridging the Forth, died recently in England at the age of 58.

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One Horiz'l Engine, 9 in. x 12 in. Erie Iron Works.
Five Horizontal Engines, 9 in. x 12 in. J. & R. J.
Four Horizontal Engines, 8 in. x 12 in. [Gray.
One Horizontal Engine, 3 in. x 6 in.
One Portable Engine, 5 horse power
Two Horizontal Return Tub. Boilers. 100 h. p. each.
Two Hor. Tub. Boilers, 5 ft. x 14½ ft., 100 2½-in. tubes
One Hor. Tubular Boiler, 5 ft. x 15 ft., 83 3-in. tubes.
Two Hor. Tubular Boiler, 6 ft x 14 ft. 67 4-in. tubes.
Two Hor. Tub. Boilers, 5 ft. x 14 ft., 50 4-in. tubes.
Two Hor. Tub. Boilers, 4½ ft. x 13½ ft., 43 4-in. tubes
Three Hor. Tub. Boilers, 4 ft. x 13 ft., 34 4-in. tubes.

MACHINISTS' TOOLS.

One Hydraulic Press, 30-in. ram, in perfect order.
One Lathe, 19 in. swing, 10 ft. bed. Fitchburg Ma-
One Lathe, 16 in. x 7 ft. bed. [chine Co.
One Lathe, 14 in. x 5 ft. bed. N. Y. Steam Eng. Co.
One Planer, 22 in. x 5 ft. bed.
One Planer, 36 in. x 16 ft. bed. Chain feed.
Two Crank Planers, 18 in. x 2 ft.
One New Haven Drill. Will bore in center of 60 in.
One New Haven Drill. Will bore in center of 30 in.
Two Ensley Drills.
One Vertical Boring Mill, bore from 26 to 90 inches.
One Turn Table and Boring Mill, 11 feet between
One Travis Boring Mill. [columns.
Two Slabbing Machines.
One Merrill Compressed Air Hammer, Hotchkiss
One Upright Drill, to the center of 62 in. [Patent.
One " " " " " 42 in.
Eighteen Drilling Machines.
Ten Bench Lathes.
One Bogardus Mill, No. 5.
One Bogardus Mill, No. 2.
One Root Blower, No. 1.
One Sturtevant Blower, No. 2.
One Large Power Punch for bridge work.
One 3000 ton Hydraulic Press and Pump.
One Dudgeon Beam Punch.
One Punch and Shears combined, will punch 1¾ hole in 1-inch iron in the center of 30 in.
One large Shears, will cut ¾ iron any size.
One Hand Punch. Pope's patent.
Three Vacuum Tanks, 6 ft. x 12 ft.
One hundred Vises.
Five Portable Forges.
Colton Drawing Machine.
One Knowles Special Pump, No. 7.
One Guild & Garrison Pump, No. 3.
Six Hardick Pumps, from No. 0 to No. 4. New.
One Woodward Pump, No. 1.
7900 lbs. ¼ Plate Iron, for safes.
Two Bliss & Williams Presses.
Five smaller.
A full line of Woodward Steam and Fire Pumps.
One hand-power Paper Cutter.

J. GRAY'S MACHINERY DEPOT,
37 Dey Street, New York, U. S. A.

Europe.

Matheson & Grant's

Address is

32 Walbrook, London, England.

Engineers and Commission Agents for all business relating to engineering and metals in Europe.

Telegraph address,
MATHESON, WALBROOK, LONDON.

FOR SALE—COLLIERY.

We offer for sale an interest, either one-half or three-fourths, in one of the best Gas Coal Mines in the Kanawha District. The purchaser will be expected to take control and management. References required. Small capital necessary. For full particulars, address
LOCK BOX 80,
Charleston, Kanawha Co., W. Va.

OPEN-HEARTH STEEL.—A gentleman having six years' experience in one of the leading open-hearth works of this country will be open for an engagement January 1, 1881. Is competent to design, superintend construction and manage works when completed. Address
OPEN-HEARTH STEEL,
Office of *The Iron Age*, 83 Reade St., New York.

SUPERINTENDENT WANTED.

A live, practical, pushing, first-class man, to take the entire superintendence of manufacturing in a large Spring and Axle Works. Must be thoroughly competent and give best reference. Address
SPRINGS AND AXLES,
Office of *The Iron Age*, 83 Reade St., N. Y.

CRUCIBLE CAST STEEL.

Wanted, by an old-established Sheffield firm, a responsible agent with good connections and references, who would buy Tool Steel, &c., for his own account. Apply
BOX 40, Post Office,
Sheffield, England.

BARGAINS IN

VERTICAL ENGINES.

The best made. 2½ to 15-horse power. Write for full particulars to
WILLIAM COOKE,
6 Cortlandt Street, NEW YORK.

MECHANIC WANTED.

A skilled mechanic, capable of constructing and operating a works for the manufacture of Wrought Iron Pipe and Tubing. Address
DUNMOYLE,
Lock Box 1459, Pittsburgh, Pa.

For Sale.

HARDWARE.—The controlling interest or the whole of a Jobbing Hardware House, already established and doing a profitable business; located in one of the large Western cities. For further particulars, address
C. A.,
Office of *The Iron Age*, 83 Reade St., New York.

For Sale.

To close an estate. The MACHINERY, FURNACES, TOOLS, &c., of a Plate and Sheet Mill complete. Terms, one-third cash, balance long time if wanted. Address
THOS. B. McKILLIP,
72 Washington St., Chicago, Ill.

SITUATION WANTED.—A man of long experience would like a situation with some first-class Hardware establishment. Best of references given. Address
B.,
Lock Box 1461, Providence, R. I.

Special Notices.

THE

Wood & Light Machine Co. Patterns

OF THE FOLLOWING TOOLS ARE FOR SALE AT VERY LOW PRICES:

Engine Lathes from 24 inch to 100 inch swing.
Driving Wheel Lathe, Double Heads, 84 inch swing, and Wheel Quartering Attachment.
Patent Shafting Lathes, 20 inch, 24 inch and 28 inch swing.
Pulley Lathes, 36 inch and 42 inch swing.
Chucking and Boring Lathe, 20 inch, 24 inch and 28 inch swing.
Upright Drills, 60 inch swing.
Traverse Drills, 28 inch swing.
Planers, to plane from 24 inches square to 72 inches square.
Slotting Machine, 12 inch stroke, 52 inch swing.
Milling Machines, Double Arms and Spindles.
Profiling Machine, two Spindles.
Boiler Plate Planer.
Quartering Machine for Locomotive Wheels.
Cutting off and Centering Machine, 1 to 5 inch.

The above Patterns are for sale in one lot or separately, and finished work from these Patterns will be taken in payment, if desired.

The Geo. Place Machinery Agency,
121 Chambers and 103 Reade Sts.,
NEW YORK.

For Sale.

LARGE SLOTTER, Table 4 ft., 6 ft. between columns, stroke 18 in., end and cross and circular movements. A heavy, well-built tool; in first-rate order; will be sold low. Photo. on application.

Also, two Column Drills, Suspension Drill, two Lathes, two Tank-Iron Punches, three Hydraulic Jacks, Hydraulic Press Pump, eighteen good Steam Pumps, two large Pulsometers, two Power Piston Blowers, 8 and 10-inch cylinders.

A. G. BROOKS & WINEBRENER,
261 N. Third street, Philadelphia.

FOR SALE.

A Large Lot of

CHROME STEEL,

Octagon, Square and Round, at less than market rates.

GLOBE HARDWARE CO.,
53 Beekman Street, New York.

ON HAND AND FOR SALE.

Horizontal Boiler, 42 in. x 10 ft., 28 4-in. tubes, ⅜ shell, 7-16 heads.
Horizontal Boiler, 42 in. x 10 ft., 90 2-in. tubes, 5-16 shell, ⅜ heads.
Vertical Boilers, with Bases, Grates and Fixtures:
42 in. x 7 ft., 90 2-in. tubes, shell and fire-box ⅜ in., heads ½ in. New.
36 in. x 6 ft., 80 2-in. tubes, shell and fire-box 5-16 in., heads 5-16 in. Rebuilt.
30 in. x 6½ ft., 47 2-in. tubes, shell and fire-box 5-16 in., heads 5-16 in. New.
30 in. x 6 ft., 55 2-in. tubes, shell and fire-box 5-16 in., heads 5-16 in. Second hand.
15½ x 36 Horizontal Engine, 9 ft. x 18 in. band wheel. Jacob Naylor.
12 x 24 Horizontal Engine, segment fly wheel 4500 lbs. James Moore.
10 x 20 Horizontal Engine, band wheel 7 ft. x 12 in.
12 x 12 Vertical Engine, band wheel 54 in. x 12 in.
7 x 12 Vertical Engine, band wheel 42 in. x 10 in.

A. G. BROOKS & WINEBRENER,
261 North Third St., Philadelphia.

TO EXCHANGE.

HARDWARE TO EXCHANGE, in lots to suit, for one-third cash, two-thirds good unincumbered real estate. All wholesale stock and in prime order. A full assortment of goods given in every exchange. Address
HARDWARE,
P. O. Box 2578,
New York City.

For Sale.

A complete stock of Shelf and Heavy Hardware, located in a live town in Central Ohio. Established 1850. "Good Payments." For particulars address
D. H., BOX 1077,
Lima, Ohio.

FACTORY

Or requisite buildings will be erected on plot 75x100 feet, on East Eighth Street, near the East River, and leased for a term of, say, ten years.

Other New York City manufacturing property for sale or to lease.

WM. J. FRYER, JR., Ætna Iron Works,
104 Goerck Street, New York.

To Window-Glass Makers.

A Western Commission House, controlling sale of twenty thousand boxes per annum, invites proposals from any factory making excellent glass. State commission. Address
ESTABLISHED,
Office of *The Iron Age*, 83 Reade St., New York.

VERTICAL ENGINES.

2½ to 15-horse power. The best made.

PRICES WAY DOWN.

Write for full particulars to
WILLIAM COOKE,
6 Cortlandt Street, NEW YORK.

A YOUNG MAN who has been in the Retail Hardware business as partner wishes a good permanent situation in a Wholesale Hardware house, either in office or shipping room. Satisfactory reference. Address
E. W. STOWELL & CO.,
Livonia, N. Y.

NOTICE.—Two young men, aged 25 and 28 years, thoroughly educated and experienced in the Machinery, Railway and Mining Supplies and Brass and Steam Work trade, also thorough bookkeepers and accountants, are open for an engagement in the West, Colorado preferred. Best reference given. Address
G. R. S.,
Office of *The Iron Age*, 83 Reade St., N. Y.

Special Notices.

Second-Hand and New Machinists' Tools.

October 28, 1880.

One Lamson, Goodnow & Co. 2-spindle Profiling Machine.
One Engine Lathe, 90 in. x 20 ft.
One Engine Lathe, 30 in. s. x 20 ft., good order.
One " " 30 in. s. x 16 ft. Wheeler, new.
One " " 30 in. s. x 12 ft. Ames, new.
One " " 28 in. s. x 27 ft. New, for shafting.
One " " 24 in. x 12 ft. Ames, new.
One " " 24 in. x 10 ft. " "
One " " 20 in. x 10 ft. Fifield, new.
Two " " 20 in. x 8 ft. Ames, new.
One " " 16 in. x 6 ft. New Haven, good order
Three " " 16 in. s. x 8 ft.
Two " " 15 in. x 6 ft. Flather, new.
One Fox Lathe.
Six Hand Lathes, 11, 14 and 16 in. s. x 4½ to 7 ft. bed.
One 16 in. stroke Shaper. Wm. Sellers & Co., A1.
Six 9 in. " " Hewes & Phillips.
Two 15-in. stroke Shapers. Hendey Mach. Co., new.
One 32 in. x 10 ft. Planer. Lathe & Morse.
One 24 in. x 5 ft. " Moore & Wyman.
Two 27 in. x 4 ft. Planer. Windsor Mfg. Co.
One 20 in. x 4 ft. Planer. Whitcomb.
One 16 in. x 3 ft. Planer. New Haven.
One 38 in. Drill, bk. geared and self-feed. New Haven,
One 34 in. " Bk. Geared. [new.
Six 20 in. " Prentice, new.
One 6-Spindle Horizontal Drilling Machine.
One 5-Spindle Horizontal Drill.
Four Newell Punch Presses.
Three No. 4 Wilder Punch Press. New. Geared.
One No. 6 " Shear Geared. "
Stephens & Boker Vises, A1 order, 3½ and 4 in.
Belting, Shafting, Pulleys and Miscellaneous Machinery.

E. P. BULLARD, 14 Dey St., New York,
GENERAL EASTERN AGENT FOR
Akron Iron Co.'s Hot Polished Shafting.

ROOMS OF

THE HARDWARE BOARD OF TRADE,

LIMITED,

Incorporated A. D. 1877.

Nos. 4 and 6 Warren St., New York.

To the Trade and Public:

We are compiling, preparatory to issuing in January, 1881, a limited number of strongly bound books, to contain the names and financial standing, as well as credit ratings, of some Fifty Thousand dealers in Hardware, Cutlery, Guns, Tinware and Stoves, Metals, Iron, Foundries, Machinery of all kinds (including Sewing Machines), Iron and Metal Pipe, Brass Fitting, Plumbers and Dealers in Plumbers' Supplies, and other trades kindred to these throughout the United States.

A large expenditure of money and the very best means have been used to obtain reliable information for the work, and those desiring it can depend upon the information being fresh and largely drawn from those selling the firms, corporations and individuals rated, and the information is as reliable as it is possible to obtain for such a work.

For Wholesale Dealers and Manufacturers it is the most desirable work of the kind, as it is prepared with great care, and should be consulted where extended credits are asked. All are not safe for credit because apparently prosperous, and detailed information given at the office will largely aid in forming correct judgments.

The Board of Directors of this company have placed a limit to the number of these books to be issued, and under no circumstances will orders placed beyond that number be filled.

The subscription price to the book is placed at THIRTY DOLLARS. *All orders must be accompanied by draft on New York for the amount.*

We respectfully ask all who desire a copy of this book to forward their orders at once, as they will be entered and filled in the order received.

THE HARDWARE BOARD OF TRADE, Limited,
By JAS. H. GOLDEY, Actuary.

Specially Low Prices for

VERTICAL ENGINES.

The best made. 2½ to 15-horse power. Write for full particulars to
WILLIAM COOKE,
6 Cortlandt Street, NEWYORK.

For Sale.

Cold Blast Charcoal Furnace.

First-class in every respect and ready for immediate blast. Stone stack, ample water power; 2000 cords seasoned wood on hand. Charcoal can be had at 4½ cents per bushel at furnace. For further particulars, address
ROBERT W. MONROE,
Kingwood, W. Va.

Wanted.

A PIG-IRON SALESMAN, of good address and experience in selling Western and Southern Irons. Address, immediately,
PIG IRON SALES,
Office of *The Iron Age*, No. 83 Reade St., N. Y.

Wanted.

A TRAVELING SALESMAN, thoroughly posted in Carriage and Saddlery Hardware and Blacksmiths' Supplies. Address, giving references, &c.,
HARRISON & KNIGHT,
Minneapolis, Minn.

Wanted.

TO BUY A HARDWARE BUSINESS, in a good, thriving county seat, where business is not overdone; a town of from 4000 to 8000 inhabitants; stock from $12,000 to $16,000. Address
THOMAS R. JONES,
Box 158, Pomeroy, Ohio.

Wanted.

TO PURCHASE 8 or 10 NAIL MACHINES.
Please address, stating size, condition and price,
NAILER,
Care of Jos. D. Weeks,
Office of *The Iron Age*, 77 4th Ave., Pittsburgh, Pa.

Sanderson Bros. Steel Co.

A limited number of shares for sale by
EDWARD FRITH & SON,
241 Pearl street, New York.

Special Notices.

ONE MILLION ELEY BROS.'

Genuine First Quality

BLUE CENTRAL FIRE

CARTRIDGE CASES

NO. 12 GAUGE.

THE BEST PAPER SHELL IN THE MARKET.

For sale at a great bargain.

ALFRED FIELD & CO.,
93 Chambers St., New York.

To Railroad Engineers, Importers and Others.

DAVID OWEN,

Inspector of Steel and Iron Rails,

Merthyr Tydfil, England,

Undertakes the inspection of Steel and Iron Rails, Permanent Way Materials, &c., &c., in England, Belgium and Germany. Thoroughly practical, of many years' experience. Can give very best of references from chief railroad engineers, merchants and others who have employed me to inspect their railroad materials during manufacture and delivery for the last 10 years.

Correspondence solicited. Instructions by mail or cable punctually attended to.

THOSE WISHING TO BUY OR HAVE FOR SALE SECOND-HAND

PRESSES or DROP HAMMERS

will please communicate with
N. C. STILES,
Middletown, Conn.

The Sherman Process Co.

9 Pemberton Square, Boston, Mass.,

Issue Licenses to use the Process for the Manufacture of Iron and Steel

In the Bessemer Converter, Crucible, Siemens-Martin, Puddling, Blast and Cupola Furnaces.

The use of this Process improves the quality of the product, saves fuel and labor, and does not require any change in furnace or manner of working. See page 17 of *The Iron Age* of Oct. 25th, 1877.

For Sale.

Stock of hardware, stoves and implements, and store furniture, in one of the best towns in Kansas.
Address HARDWARE,
Box 366, Salina, Kansas.

FOR SALE.

A works completely equipped for the manufacture of Carriage Axles. Is well located in relation to coal and iron, also very accessible to market.
Address E. P. BULLARD,
14 Dey St., New York.

FOR SALE,

Job Lots and Bankrupt Stocks Hardware.

Great bargains offered to the trade.

A. W. WHEELER,
141 Lake St., Chicago, Ill.

For Sale.

One of two stocks of Hardware, Stoves, Tinware and Agricultural Implements, situated one in Winfield, Kansas, and one in Douglass, Kansas, both doing a good business; stock about $5000 each; good reasons for selling. None but cash buyers need address
D. S. ROSE,
Winfield, Kansas.

For Sale.

In Southern Central Iowa, the only wholesale and retail

Heavy and Shelf Hardware Store

at the county seat of a county containing 10,000 inhabitants, is offered at reasonable figures. Business established for 30 years. Cash customers only need apply. Address,
J. STEELE,
Office of *The Iron Age*, 83 Reade St., New York.

ENGINE AND BOILER FOR SALE.

Steam Engine, 6 x 15, with 15-horse-power boiler, feed pump and heater, nearly new and in good order. One (1) second-hand "Peck" Lifter, not geared; will raise hammer of 300 lbs. in weight.
BEECHER & PECK,
Lock Box 128, New Haven, Conn.

Just Published.

STEEL:

Its History, Manufacture, Properties, and Uses.

By J. S. JEANS,

Secretary of the Iron and Steel Institute.

Section I. *History of Steel:* Chap. 1. History of Steel; 2. Early History in England; 3. Progress of Invention; 4. History of Bessemer Process; 5. Siemens-Martin Process; 6. Other Steel-making Processes; 7. Steel in America; 8. Germany; 9. France; 10. Austria; 11. Russia; 12. Sweden; 13. Other Countries.—Section II. *Manufacture of Steel:* Chap. 14. Cementation and other Methods; 15. Manufacture by Bessemer Process; 16. Siemens-Martin Process; 17. Other Methods.—Section III. *Chemical and Physical Properties of Steel:* Chap. 18. Phosphorus in Steel; 19. The Use of Manganese; 20. Spiegeleisen; 21. Sulphur in Steel; 22. Silicon in Steel; 23. Tensile Strength of Steel; 24. Mechanical Tests of Steel; 25. Analysis of Steel.—Section IV. *Uses of Steel:* Chap. 26. Application of Steel to Railway Purposes; 27. To Shipbuilding; 28. To Bridge Building; 29. To General Purposes; 30. Guns and Armor Plates; 31. Other Purposes.

Price.......................................$14.50

For Sale by
DAVID WILLIAMS,
83 Reade St., New York

Trade Report.

Office of The Iron Age, Tuesday Evening, November 23, 1880.

Owing to the occasion of a general holiday on Thursday, we go to press this week a day earlier than usual to avoid the otherwise inevitable delay of 24 hours in distributing our edition. This is a matter of great importance to distant subscribers, but it involves the omission of some of our customary statistical tables:

The financial markets, after more or less excitement, have become active and steady. The local money market is active at 6% on call, and the same rate is offered to those wanting money until the end of the year on good collaterals. The rate on loans until February is 5%. The discount rate on prime mercantile paper is 4½% @ 6%.

The stock market, which has been irregular during the week, has developed a steady activity, with a lively speculation, and prices in some instances ranging higher than any previous quotations. All the speculative stocks have experienced a "boom," but the market closes decidedly weak. We give below the closing quotations of stocks on the active list.

United States bonds are quiet and firm; railroad mortgages are irregular, but generally higher. We give below the closing quotations of governments.

The bank statement makes the following comparison of aggregate averages for the past two weeks.

	Nov. 13.	Nov. 20.	Comparison.
Loans	$324,970,000	$315,354,000	Dec. $9,636,000
Specie	64,955,400	60,830,600	Dec. 4,124,800
Legal t'nd'rs.	12,474,000	12,078,200	Dec. 395,800
Tot. reserve.	77,430,300	72,909,500	Dec. 4,520,800
Deposits	307,708,200	295,811,400	Dec. 11,896,800
Reserve required	76,927,650	73,967,850	Dec. 2,959,800
Surplus	503,250	1,941,650	Inc. 1,438,400
Circulation	18,708,700	18,730,400	Inc. 21,700

The foreign trade movements for the week are shown in the following tables:

IMPORTS.

For the week ended November 20:

	1878.	1879.	1880.
Total for week	$3,928,194	$8,140,956	$9,687,855
Prev. reported	248,867,381	281,294,298	422,631,297
Since Jan. 1	$252,795,575	$289,435,254	$432,319,152

Included in the imports of general merchandise for the week were articles valued as follows:

	Quantity.	Value.
Anvils	168	$1,500
Brass goods	20	1,708
Bronzes	19	3,262
Chains and anchors	3	373
Copper		1,928
Cutlery	139	46,050
Guns	74	14,567
Hardware		689
Pins		895
Iron, hoop, tons	315	13,152
Iron, pig, tons	4,256	84,637
Iron, sheet, tons	273	37,983
Railroad bars	11,692	103,183
Iron cotton ties	4,680	4,837
Iron tubes	235	842
Iron ore, tons	2,823	8,984
Iron, other, tons	1,847	45,114
Metal goods	117	11,470
Needles	7	3,456
Nickel	11	3,226
Old metal		132
Platina	1	4,235
Plated ware	2	137
Percussion caps	8	1,484
Saddlery		295
Steel	4,974	38,867
Silverware	5	247
Tin, boxes	17,268	74,629
Tin, 8,729 slabs; 464,562 lbs.		142,119
Wire	298	1,663

EXPORTS OF SPECIE.

For week ended November 20:

Total for the week	$438,500
Previously reported	7,078,030
Total since January 1, 1880	$7,211,530
Same time in 1879	13,575,674
Same time in 1878	11,533,494
Same time in 1877	24,272,883
Same time in 1876	42,277,213
Same time in 1875	69,098,406
Same time in 1874	48,463,313
Same time in 1873	46,040,628
Same time in 1872	67,091,529

The closing quotations for United States bonds were as follows:

	Bid.	Asked.
U. S. 6's 1880 registered	100¼	102¾
U. S. 6's 1880 coupon	100¼	102¾
U. S. 6's 1881 registered	104⅜	104⅝
U. S. 6's 1881 coupon	104⅜	104⅝
U. S. 5's 1881 registered	101⅝	101¾
U. S. 5's 1881 coupon	101⅝	101¾
U. S. 4½'s 1891 registered	111½	111⅝
U. S. 4½'s 1891 coupon	111½	111⅝
U. S. 4's 1907 registered	111⅝	111¾
U. S. 4's 1907 coupon	111⅝	111¾
U. S. Currency 6s 1895	130	—
U. S. Currency 6s 1896	131	—
U. S. Currency 6s 1897	132	—
U. S. Currency 6s 1898	133	—
U. S. Currency 6s 1899	134	—

The following were the closing quotations of stocks in the active list:

	Bid.	Asked.
Arizona	8½	9
Atlantic and Pacific Telegraph	40	40½
Alton and Terre Haute	32	33½
" " Pref.		109½
Caribou	2⅜	2½
C. C. and I. C.	20	21
Canada Southern	69	70
Delaware, Lack. and Western	100½	100¾
Delaware & Hudson Canal	90	90½
Erie and Western	32¼	32½
Excelsior Mining		8¾
Express—Adams	120	—
" Wells, Fargo	112	113
" American	65	65½
" United States	53	54
Hannibal and St. Joseph	41¾	42
" " Pref.	92	92½
Homestake	30	30½
Iron Mountain	50½	50¾
Illinois Central	121½	122
Kansas and Texas	39½	39¾
Little Pittsburgh	2½	3
Michigan Central	113	113¼
Morris and Essex	120	120½
New York Central	143½	144
Northwest	116½	116⅝
" Pref.	140	141
Ontario Silver	33	34
Oregon Navigation	129	129½
Omaha	42½	43
" Pref.	84	84½
Ohio	35	36½
" Pref.	86	86⅝
Rock Island	124	125
Reading	50½	50⅝
Standard	23	23½
St. Paul	100½	100⅝
" Pref.	120	121
Sutro Tunnel	1¼	1⅜
Stormont	4½	5
Wabash	41½	41⅝
" Pref.	77	77½
Western Union Telegraph	86½	86⅝
American District Telegraph	76	77½
Chicago and Alton	142	142½
Erie	45⅛	45¼
" Pref.	76¾	77

MINING STOCKS.

The following were the closing quotations of the New York Mining Stock Exchange:

	Bid.	Asked.
Amie	41	42
Bell Isle	70	75
Bechtel	75	....
Buckeye	17	18
Bull Dom	4.95	5.12½
Bulwer	1.30	....
Calaveras	31	32
California	1.60	1.65
Climax	62	64
Consolidated Virginia	2.25	2.35
Chrysolite	6.75	6.87½
Cherokee	1.90	1.95
Findley	34	36
Great Eastern	35	37
Gold Placer	70	71
Gold Stripe	2.65	2.75
Goodshaw	80	85
Granville	5	6
Hukill	1.65	1.75
Horn Silver	10.20	12.50
Independence	38	....
Iron Silver	4.30	4.50
Lacrosse	20	29
L. Chief	1.15	1.25
Little Pitts	2.50	2.60
Moose	95	....
Navajo	90	1.00
Rappah'k	22	24
Robinson	9.75	11.00
S. B'dle	7	....
S. Hite	37	40
S. Bulwer	35	....
Silver Cliff	2.15	2.30
Sutro	85	95
Tioga	42	44
Tuscarora	26	....
Unadilla	13	14

GENERAL HARDWARE.

The volume of business, though not large, is still satisfactory when the season is considered, and for holiday goods, Skates, &c., the demand, since the cold weather set in, has been active.

Hermann Boker & Co., Nos. 101 and 103 Duane street, have purchased the entire stock of George Wostenholm & Son, Limited, celebrated I X L Scissors, and will carry in their warehouse in this city a full line of these goods for the convenience of the trade. They have also taken the agency of Ward & Payne, Sheffield, for their Solid Steel Sheep Shears (machine made) and their well-known California and Australia Shear, No. 38, of which they have a full line in stock.

We have received the following circular:

Auburn, N. Y., November 19, 1880.

Dear Sir.—We have this day made the following reductions in our prices:

	Dis. per cent.
Auburn Pattern Shaft Couplings	50&5
" " Pole "	50&5
" " Eyes	45&5
Plain King Bolts, Nos. 1 and 2, $1.50 per doz. net	5
" " " No. 3, $2 per doz.	5
Flange " Nos. 1 and 2, $2.40 per doz.	5
" " No. 3, $3 per doz.	5
" " No. 4, $4 per doz.	5
Buggy Saddle Clips, $1.80 per doz. set	5
" " Dbl. Fch. $1.60 per doz. set	5
Body Loop Ends, Single Lip, $0.33⅓ per set	5
Long Joint Ends, $0.20 per set	5
Phil. Slat Irons, 4 and 5 Bow	60&5
Diamond Step Pads, No. 1 Refined, $3 pr. dz. prs.	5
" " " No. 2 Refd. $3.25 pr. dz. prs.	5

Net, 30 days. Awaiting your orders, we are yours truly,

The E. D. Clapp Mfg. Co.

In our last issue we mentioned that the Old Colony Iron Company had made reductions in the list prices of some patterns of Shovels and Spades, to correspond with the new prices announced by Oliver Ames & Sons Corporation. Their circular, which we print below, shows the changes that have been made:

[Attach this to our Price List, August 1, 1880.]

Taunton, Mass., November 10, 1880.

Gentlemen: We have reduced the prices of the following goods on our price list of August 1, 1880:

	Cts. per doz.
C. P. Bruce, Steel Edge Shovels and Spades	50
D. Pratt, Steel	50
A. L. Reed, Steel	50
C. Miller, Iron	50
Carr, Iron	50
Saunders, Iron	50
F. Stanley, Solid Steel	75
Carr, Steel Scoops	75
Ward	75

On and after this date we shall allow on all of our goods a discount of 10 per cent. from our price list. We also allow an extra discount of 6 per cent. to all parties whose net purchases from us exceed $500 in six months. Our terms are net cash, payable in Boston or New York funds, we reserving the privilege of drawing at sight, with exchange, for all bills not paid within 30 days. Interest from date at 7 per cent. will be charged on all invoices not paid promptly. We prepay the freight on our goods to Boston or New York, but all goods are at risk of purchaser after shipment from the factory. All orders will be filled at the prices ruling at the date of shipment. We have facilities for filling orders of any amount at short notice. All goods ordered will be shipped with dispatch.

We would call your attention to our patent solid cast-steel Scoop, it being the only Scoop made without back and front strap riveted on the blade, and recommend it for many purposes superior to any scoop manufactured. Yours truly,

Old Colony Iron Co.

The demand for Nails is light and the tone of the market has not improved since our last writing. We quote 10d. to 60d. $2.75, net, in wholesale lots; for small parcels a slight advance on this figure is asked.

Bissell & Welles announce, in an advertisement on the opposite page, that the last sale this year by order of the Cutlery Association will take place at their sales rooms on Friday, December 3, commencing at 10 a. m. Over 12,000 dozen Table Knives and Forks (seconds), also a line of Carvers', Butchers' Knives, Plated Knives, &c., will be offered.

IRON.

American Pig.—The only sales worthy of mention that have come to our notice during the week are 1000 tons No. 1 and 1600 tons No. 2 X Foundry, both on private terms. The tone of the market is decidedly strong, and the inquiry for future delivery is large. We quote as before: Foundry No. 1, $25 @ $26; Foundry No. 2, $21; Gray Forge, $20.

Scotch Pig.—The market for Scotch Iron is stronger this week than it has been in some time, and the sales reported below are said to have been made at full prices. In addition to a fair business in small lots, the aggregate of which is considerable, the following sales have been made since our last writing: 100 tons Carnbroe, 400 tons Glengarnock and 300 tons Coltness. We quote: Eglinton, $21.50 @ $22; Carnbroe, $23 @ $24; Coltness, $24.50 @ $25; Glengarnock, $23 @ $24; and Gartsherrie, $23.50.

Rails.—No new business, either in Steel or Iron Rails, is reported during the week. We repeat former quotations, viz.: Iron, $46 @ $49, and Steel Rails, $59 @ $63.

Old Rails.—Under an active demand for Old Rails the tone of the market has hardened, and it would be difficult to place orders at the prices realized on late transactions. Sales are announced of 5300 tons Old Ts at $26.50, cash, and 1200 tons at $26.75. The closing quotation is $27 @ $28 for Ts and D. H. respectively.

Scrap.—Sales are reported of 4-7 tons Wrought Scrap at $26 ex ship; No. 1 Wrought, from yard, is quoted $27 @ $28.

METALS.

Copper.—Nothing has occurred since our last report in the way of sales, but the feeling seems to be a rather improved one. The asking price for Lake Superior Copper is 18⅞¢ @ 19¢, spot and to arrive. There is no change reported from London per cable. Messrs. W. T. Sargant & Sons, London, in their report of Nov. 4, express themselves to the following effect: "There has been a gradual hardening of prices during the past month. The advance in price is only trifling; it has rather been caused by the withdrawal of sellers than any special activity in the demand. Charters from the West Coast have again been small, and the deficiency in shipments is now very considerable, but owing to small deliveries of Chili produce, the summary of total available supplies again shows an increase." The charters on the West Coast during the first 10 months have been only 35,800 tons, against 43,900 in 1879, 41,300 in 1878, 38,600 in 1877, 42,800 in 1876 and 39,400 in 1875; in other words, they have been the lightest since 1874. To some extent late light shipments from there to Europe have been due to the extraordinary appreciation of the exchange on London while peace negotiations under mediation of the United States were going on; the exchange ran up so fast, and yet the aspect was so doubtful, that business was hampered thereby. Manufactures remain as under: Bottoms, 31¢; Braziers, according to size, 28¢ @ 34¢; Circles, 31¢ @ 34¢; Segment Sheets, 31¢; Firebox Sheets, 28¢; Sheathing, 26¢; and Bolt Copper, 28¢.

Tin.—Our market is firm, although the sales during the week do not amount to over 150 tons Straits at 20¾¢ @ 21¢. The jobbing demand is reported to be fair. Foreign markets continue to be firm and advancing. London cables Straits Tin, £93 for spot, and £94 for afloat; Singapore cables $29 per picul, which is the parity of 22¢ here. Deliveries in Europe continue to be large, the first half of November in England and Holland amounting to 700 tons. A strong combination of capitalists is reported to have been formed in England and Holland in support of an upward movement, and there is reason to suppose that through its instrumentality the price on the other side may sooner or later be pushed still higher than it rules to-day. In this they may be assisted by the reported light stocks at Singapore and Penang, of which the cable speaks. The market, in response to all this closes active here and very firm; Straits, large lines at 21¢ @ 21¼¢; Billiton, 20¾¢ and Australian, 20¾¢ @ 21¢. *Tin Plates.*—Both the consumptive and jobbing demand has been lively, but large lots are not very strong and remain rather quiet. Liverpool also cables an active market, and quotes ordinary Coke nominally 15/6, best grades bringing 16/ @ 17/6. We quote in this market toward the close, large lots, ordinary brands, per box: Charcoal Bright, $6 @ $6.25; ditto Ternes, $5.37½ @ $5.50; Coke Tin, $4.95 @ $5 12½; and ditto Ternes, scarce, $5.25. The shipments from England during nine months have been, to all quarters, 160,300 tons, against 144,000 last year and 112,300 in 1878.

Lead.—This metal has given rise to but a circumscribed amount of business, in a jobbing way, at $4.80 @ $4.85, while Refined remains nominally 5¢. Messrs. French & Smith, of London, under date of November 4, say of Lead: "During the greater part of October Lead was dull and difficult of sale, and declined to £14. 15/ for Spanish soft and £15. 5/ for rich silver. Toward the close of the month some improvement took place to £15 for soft Spanish and £15. 15/ for rich silver; £15. 17/6 has since been paid for rich silver. Soft Spanish is firm at £15; English, £15. 5/ @ £15. 15/. We estimate the arrivals last month at about 6500 tons."

The imports and exports, January to September (nine months), were, by the Board of Trade returns:

	1880. Tons.	1879. Tons.	1878. Tons.
Imports	68,977	74,875	75,306
Exports	23,811	29,376	26,812

The exports of Pig and Bar Lead from London and Liverpool to the East for the first 10 months of 1878, 1879 and 1880 were as follows:

To	1878. Tons.	1879. Tons.	1880. Tons.
Madras	219	260	69
Calcutta	538	464	236
Bombay	178	646	463
China	8,885	4,760	5,721
Japan	854	351	252
Singapore and Penang	96	151	145
Total	10,770	6,632	6,886

Manufactures are quoted as follows: Sheet Lead, 7¢; Lead Pipe, 6½¢; Tin-lined ditto, 15¢ and Block Tin Pipe, 40¢.

Spelter and Zinc.—The market has remained as dull as heretofore, and no change can be reported in quotations. Common Domestic Spelter remaining 4⅞¢, nominally, while Sheet Zinc is worth $7.20 @ $7.25. In the London market Spelter declined in October, from £17. 10/ to £16. 5/, at which latter figure it finally stiffened, the London stock being 167 tons, against 373 in 1879; on October 1, 1880, it was 162 tons.

Antimony.—No change can be reported, but the market is stronger. We quote the range nominally, 15¼¢ @ 16¢. London, at the time the last mail left, was decidedly firm.

IMPORTS

Of Hardware, Iron, Steel and Metals into the Port of New York, for the Week ending November 22, 1880:

Hardware.

Boker Hermann & Co.
Cases, 26
Casks, 3
Burkinshaw W. C.
Cases, 2
Curley & Bro.
Cutlery, cases, 3
Charles H. P.
Millstones, 249
Grindstones, 99
Drexel, Morgan & Co.,
Arms, cs., 12
Field A. & Co.
Mdse., pkgs., 3
Chains, cks., 3
Graef Cutlery Co.
Mdse., pkgs., 2
Hildick A. H.
Anvil, 1
Vises, 16
Casks, 2
Harmer, Hayes & Co.
Mdse, pkgs., 3
Hartley & Graham,
Cutlery, cs., 2
Arms, cs., 12
Mdse., pkgs., 1
Livingstone W. & F.
Millstones, 583
Merchants' Dis. Co.
Arms, cs., 10
McCoy & Saunders
Mdse., pkgs., 7
Moore's J. P. Sons,
Arms, cs., 35
Caps, cs., 3
Sussfield, Lorsch & Co.
Case, 1
Schoverling & Daly
Arms, cases, 31
Tieman G. & Co.
Cases, 4
Whitte John G. & Bros.
Mdse., pkgs., 4
Wiebusch & Hilger
Hdw. Co.
Cutlery and hdw., pkgs., 21
Order,
Cases, 2
Bales, 8
Bdls., 60
Guns cs., 15
Grindstones, cs., 29
Stroud W. L.
Hoops, bdls., 975
Watson J. H. & Co.
Wire rope, coil, 1
Order,
Hoops, bdls., 4995
Scrap rails, 2970
Wire rods, bdls., 334
Rods lots, 491
Wire, bdls., 405
Spiegel, kilos, 40,600
Pig, tons, 305
Mang. ore, tons, 6¾

Iron.

Carey & Moen
Wire Rods, bdls., 274
Coddington T. B.
Sheet, boxes, 62
Johnson J.
Pkgs., 95
Knauth, Nachod & Kuhne
Machinery, cs., 4
Lundberg G.
Bars, 3175
Milliken & Smith,
Wire, bdls., 550
McCoy & Saunders
Bundles, 187
Mdse., pkgs., 67
New York Nat. Bank Association
Hoops, bdls., 14,985
Comares & Cushman
Scrap, tons, 53
Scrap, bdls., 22
Prosser Thos. & Sons
Beams, 40
Brake fix., cs., 10
Boiler plates, 10
Seager Bros.
Pig tons, 100

Steel.

Abbott J.
Cases, 22
Carey & Moen
Bundles, 275
Moss F. W.
Bundles, 99
Bars, 4
Prosser Thos. & Son,
Springs, bdls., 21
Tire forgings, 2
Bands, 247
Bars, 21
Temple & Lockwood,
Bundles, 96
Bars, 13
Cases, 4
Woodford W. O.
Cases, 16
Order,
Cases, 13
Casks, 4
Bundles, 2022
Steel rail crops, tons, 98
Rods, bdls., 50
Spring leaf, tons, 162

Metals.

Agostini J.
Scrap cop'r, cs., 2
Baring Bros.
Tin, slabs, 624
Byrne Jos. & Co.
Tin plates, bxs., 2583
Canadian Bank of Commerce
Scrap cop'r, bag., 1
Coddington T. B.
Tin plates, bxs., 162
Dickerson, Van Duzen & Co.
Tin plates, bxs., 3200
Jackson R. D.
Tin, bbls., 10
Leaycraft & Co.
Scrap, cks., 3
Phelps, Dodge & Co.
Tin plates, bxs., 10,974
Black taggars, bxs., 263
Pomares & Cushman
Scrap zinc, cs., 6
Scrap brass, cs., 1
Punderford & Senny
Scrap cop'r, bxs, 1
Semon, Bache & Co.
Tin plates, cs., 6
Yates & Porterfield
Scrap brass, bxs., 8
Scrap brass, pcs., 14
Order,
Tin plates, bxs., 35,969
Tin, ingots, 680
Tin, slabs, 1163
Tin plates, cs., 1
Tin, case, 1
Antimony, cks., 100

OLD METALS, PAPER STOCK, &c.

The market continues dull and inactive.

The purchasing prices offered by dealers for Old Metals are as follows:

Copper, heavy	℔ lb.	$0.15½	@ $0.16½
Copper Bottoms	"	.13	@ .14
Yellow Metal	"	.09	@ .09½
Brass, heavy	℔ lb.	.11	@ .12
Brass, light	"	.08½	@ .09½
Composition, heavy	"	.13½	@ .14½
Lead, heavy	"	.04	@ .04½
Tea Lead	"	.03¾	@ .04
Zinc	"	.03½	@ .03⅝
Pewter, No. 1	"	.12	@ .13
Pewter, No. 2	"	.08	@ .09
Wrought Iron	℔ ton	21.00	@ 22.50
Light do	"	10.50	@ 12.00
Stove Plate	"	10.00	@ 11.00
Machinery do	"	15.00	@ 16.00
Grate Bars	"	6.00	@ 7.00

The prices current for Rags, &c., are as follows:

Canvas, Linen	℔ lb.	3½c.	@ .....
White Cotton, New	"	3½c.	@ .....
" " No. 2	"	2½c.	@ .....
White, No. 1	"	3½c.	@ 4c.
" No. 2	"	2¾c.	@ .....
Seconds	"	1½c.	@ 1¾c.
Soft Woolens	"	10 c.	@ .....
Mixed Rags	"	2 c.	@ 2½c.
Gunny Bagging	"	1¾c.	@ .....
Jute Butts	"	2¾c.	@ .....
Kentucky Bagging	"	3 c.	@ .....
Book Stock	"	2½c.	@ ....
Newspapers	"	1½c.	@ 1¾c.
Waste Paper and Scraps	"	1½c.	@ ¾c.
Kentucky Bale Rope	"	4 c.	@ ....

PHILADELPHIA.

Office of *The Iron Age*, 220 South Fourth St., Philadelphia, Nov. 23, 1880.

Pig Iron.—The market for Pig Metal is unchanged, and prices are firmly maintained. The amount of business transpiring has not been large, but transactions made during the early part of the month has left the market somewhat bare of stock, so that prices are not affected by the apparent inactivity. The feeling is becoming general that higher prices will prevail after the holidays, but as yet we have heard of very few transactions in Foundry Iron in which deliveries are to extend into the new year. Mill Irons have sold for delivery up to March, at $20 to $21. In the meantime, Foundry Irons are very firm, and the best brands now command $25 @ $26 (some are held at still higher figures); No. 2 about $21, and Gray Forge $20 to $21. Scotch Iron is in limited supply, and held at $21.50 @ $25, according to brand. Sales of Eglinton at $21.50 @ $22, and Gartsherrie at $24.50 @ $25. Charcoal Iron $33 to $35 for Warm-blast, and $35 to $39 for Cold-blast.

Muck Bars.—No demand of importance, and no transactions except in very small lots. Holders ask $39 at mill, but buyers appear to be fully supplied for the present.

Blooms—Are very dull, and it is impossible to make sales unless at concessions of $2 to $3 per ton. Asking rates are as follows: Cold-Blast Charcoal Blooms, $67.50 @ $70 per ton of 2464 lbs.; Run-out Anthracite, $57.50; Sunken Scrap Blooms, $52.50 per ton of 2240 lbs.; and Northern Ore Blooms, $48 @ $50.

Structural Iron.—Nothing of importance has been done in this department, but the mills are not in any immediate need of orders. A considerable amount of work was entered a couple of weeks ago, and there is a fair current demand, but the capacity for production is very large, and it requires a heavy consumption to keep all the mills busy. Prices are unchanged, but for desirable orders concessions could probably be had from quoted rates, which are as follows: Angles at 2.6¢ @ 2.7¢, Beams at 3¢, Channels and Tees, 3.2¢.

Sheet Iron.—The cold weather appears to have had quite an effect on the market, and business has been very active during the past three or four days. Manufacturers report numerous inquiries, some for large lots, and the outlook has improved considerably. Prices are the same as last quoted, viz.:

Common Sheet, No. 26 to 28	4¾¢
Common Sheet, No. 22 to 25	4½¢
Common Sheet, No. 16 to 21	4¼¢
Best Refined ¼¢ @ ½¢ advance on the above.	
Best Bloom Sheets, No. 26 to 28	7¼¢
Best Bloom Sheets, No. 22 to 25	7 ¢
Best Bloom Sheets, No. 16 to 21	6¾¢
Common Red Plates, 3-16 to 16	3.4¢
Blue Annealed, 3-16 to 16	3.5¢
Best Bloom Galvanized, discount	30 %
Second quality, discount	40 %

Plate and Tank Iron.—The current demand is fair, but inquiries for large lots are not so numerous as they were some time ago. This is explained by the heavy business done in the early part of the month, which, in the meantime, will keep manufacturers fully employed until the close of the year. Skelp is in demand, and orders for a considerable amount are likely to be on the market in course of the next 10 days. Skelp is quoted firm at 2.4¢. A sale is reported of 100 tons Flange Iron for California. Tank and Common Plate, 2.75¢ @ 2.87½¢; C. No. 1, 3.3¢; C. H. No 1, 3.5¢; Flange Iron, 4¾¢ @ 5¢; Fire Box, 5¾¢ @ 6¢.

Bar Iron.—There is little more activity than we have noticed for some time past, two or three good-sized orders having been placed during the week at fair prices. The tendency is toward improvement, and more remunerative prices are looked for before the end of the year. In the meantime we have reason to believe that the average price realized was higher than during the week previous. There are very few sellers at 2.3¢, and, in fact, 2.35¢ has been declined for one large order, although there are several who will enter at that rate freely. A sale of 500 tons is reported to-day, price said to be equal to 2.4¢ in Philadelphia. The market is irregular, some mills being full of work, others only partly employed; but, as we said before, there is a firmer feeling and prospect of further improvement at an early date.

Steel Rails.—The market has been quite active, and sales to the extent of 20,000 tons were made during last week. The heaviest portions of the orders were taken by Pennsylvania mills, at prices ranging from $57.50 @ $60 at mill, the inside figure being for deliveries during the last half of 1881. There are other buyers in the market, and manufacturers are entering orders quite freely at the rates above quoted. As intimated in our last report, manufacturers are endeavoring to keep as much business in the country as possible, and are, therefore, entering more business than is usual at this season. Prices may be quoted, $58 @ $62.50 at mill, according to time of delivery.

Iron Rails.—The market is rather quiet, and only a few sales of small lots have been reported during the past week. Holders are firmer in their views, and it would be difficult to place orders at less than $47 for standard Rails. There are no inquiries in the market of special importance, and we do not look for much activity at present. In the meantime the mills have sufficient orders to keep them employed until the end of the year, by which time plenty of business is expected. Current quotations are about $47 for 56's and $48.50 @ $53 for light sections.

Railway Supplies—Prices are steady as follows: Spikes, 2.65¢ @ 2.75¢; Fish Plates, 2.5¢; Track Bolts, 3.75¢ @ 4.50¢, according to specification.

Old Rails—Are steady, but not very active. Flanges are held at $27, Doubles at $28, with sales of the last named at $28. There is not quite so much demand for Flanges, and concessions would probably have to be made before much business would be done.

Scrap Iron—Is scarce and prices are fully maintained. Cast sells at $19 @ $20; Wrought, $26 @ $29, and for extra choice, $30 has been paid.

PITTSBURGH.

Office of *The Iron Age*, 77 Fourth Avenue, Pittsburgh, Pa., Nov. 23, 1880.

While general business is not as active, possibly, as it was a few weeks ago, it is better than it ordinarily is at this season of the year. There is usually a falling off in the demand for most of the leading Pittsburgh manufactures this month, and no material improvement is looked for until January, after stock-taking has been completed and annual settlements effected.

River navigation from this point is suspended, caused by low water and cold weather, the effect of which will be to curtail trade somewhat, but it will be an advantage to those of our coal operators who have coal in the down river markets, as, with the source of supply cut off, the price will go up.

Pig Iron.—There has been no essential change in the general position of the market since the date of our last report. We can report a fair, healthy business, notwithstanding consumers, as a rule, are buying only as their immediate actual wants require; and while the feeling on the part of producers is one of confidence, prices remain unchanged, and the general opinion among the trade is that there will be no change of any consequence between now and the close of the year. The statement made by some of the Pittsburgh papers, that there is to be an immediate advance, and that mill owners will either have to pay more for Pig Iron or shut down their mills, is without foundation. It is freely admitted

that furnacemen would like to obtain higher prices, and some are asking an advance; but consumers are still able to obtain all the Pig they want at the prices that have been ruling for the past two months. As stated in our report of last week, prices of Manufactured Iron are unremunerative, and while this continues consumers will be in no mood to pay an advance for the raw iron. Commission men generally have very little hope of obtaining an advance for raw Iron before January, during which month it is expected that there will be a largely increased demand. Forge Irons may be fairly quoted as follows: Cold Short, $20 @ $21.50, 4 mos.; Neutral, $22 @ $23; Red-short, cinder mixture, $23 @ $24; all-ore ditto and Bessemer, $25 @ $28. Sales of Mottled Bessemer at $25, and a small lot of strictly No. 1 at $28, 4 mos., the latter probably for foundry use. Foundry grades remain unchanged—$23 for No. 2 to $25 for No. 1; Eastern Cold Blast, $38 @ $40; Hanging Rock ditto, $40 @ $45.

Manufactured Iron.—There is a fair degree of activity. The mills generally are employed, some of them working up to their full capacity; but, strange as it may appear, prices continue irregular, and for some of the leading makes, unremunerative. While manufacturers generally quote at from 2.15¢ to 2.25¢ rates for merchant bars, 60 days, 2 per cent. off for cash, it is reported that sales are being made as low as 2¢ rates. Skelp Iron may be quoted about the same as bars. It is stated that an order was placed here recently at 2¢, but it is hard to believe. Sheet Iron is quotable at 3.65¢ @ 3.85¢ for No. 24, according to classification, time of delivery and size of order. The demand for Plate Iron is less active, and prices are weaker, 2.90¢ @ 3¢. Tank Iron continues steady, owing to the fact that the mills are nearly all oversold at 3.20¢ @ 3.25¢. Hoop Iron 3¢ @ 3.10¢.

Nails.—There is a fair jobbing business, but not much inquiry for round lots. Prices remain about as last quoted—$2.75, 60 days, 2 per cent. off for cash, with an abatement of 10¢ per keg on carload lots.

Wrought Iron Pipe.—While possibly orders are not coming forward quite so freely, the mills are all busy, not only here, but throughout the country, and likely to be so until the close of the year. Discount on Gas and Steam Pipe unchanged at 60 @ 65%; on Boiler Tubes, 40%; Oil Well Casing, 70 @ 75¢ per foot, net; ditto Tubing, 21¢, net. If the present cold weather should continue, the work of development in the oil-producing regions will be very much curtailed, and if so the demand for Casing and Tubing will be very much reduced.

Steel.—There is a continued fair degree of activity. The mills generally appear to be busy, but there is considerable complaint in regard to prices. Refined Cast Steel is still quoted at 11¢ @ 12¢; Crucible Machinery Steel, 6½¢ @ 7¢; Bessemer and Open-hearth Steel, 5¢ @ 5½¢; Bessemer and Open-hearth Spring Steel, 4¢ @ 4½¢.

Railway Supplies.—There is an increasing demand for goods of this character, and prices are steady. Spikes, 2½¢ ℔ lb, 30 days; Splice Bars, 2.15¢ @ 2.25¢; Track Bolts, 3¼¢ @ 3½¢ with square and 3¾¢ @ 4¢ with hexagon nuts, according to size of order and time of delivery. In regard to Steel Rails the most and about the only feature to note is that the orders given out by the Northern Pacific Railway last week have filled the mills so full that some of them will be out of the market for several months to come. The mill here, the Edgar Thomson, is said to have orders booked sufficient to absorb its entire production until next July.

Ores.—While furnacemen do not look for Ore to be any cheaper for some time to come, they do expect, in view of the fact that Ore fields are to be opened up early in 1881, to be able to buy for considerably less money next spring and summer. Capitalists have been investigating new Ore fields in different localities during the present year, and arrangements will, no doubt, be made to have Ores from some of these new fields in the market next spring, if not before. It is very evident that our furnacemen must have cheaper Ores, and the sooner the better.

Scrap.—There is a fair movement in some kinds of Scrap, but prices are irregular, and it is difficult to give correct quotations. It is hard to find two Scrap dealers who will give the same quotation for the same kind of Scrap. Some of them think the prices they are willing to pay should be quoted only. Following are about the rates demanded by dealers from consumers: No. 1 Selected Wrought Scrap, $28 ℔ net ton; No. 1 Machinery Metal, $20 @ $21, gross; Old Car Wheels, $32 @ $34, gross; No. 1 Wrought Turnings, $18 @ $20, net; Cast Borings, $14 @ $16, gross; Railroad Car Springs, $40 @ $42, net; do. Car Axles, $36 @ $38.

Window Glass.—While fresh orders have fallen off, some of the factories are still busily engaged in working up old contracts. No change in card or discounts.

Coke.—There is a steady demand, and but for the difficulty in getting rail transportation, the volume of business would be considerably larger. Those operators who own their own cars are doing well enough; but others, who are dependent upon the railway companies for cars, complain that their business has been restricted for some time past for want of transportation. Prices steady, but unchanged, at $1.50 per ton, delivered free on cars at ovens; $1.65 @ $1.75 for small orders.

Coal.—The cold weather has stimulated the Coal business, not only in Pittsburgh, but at all points depending upon Pittsburgh for supplies, and then with navigation suspended and source of supply by river shut off, the down-river markets will stiffen and an advance is not improbable. Nearly all the mines in the Monongahela and Youghiogheny Valleys are in operation, and the price for mining is generally 3½¢ per bushel.

Petroleum.—There has been no change in the situation during the past week, with the exception that there is possibly a firmer feeling. The cold weather will do toward curtailing, if it does not suspend, development in the producing regions, and there are those who believe the raw article is good property at current rates. There has been a good deal done in buyers' option for next year, and there are, it is said, a good many people waiting to invest their money in it, when satisfied that hard pan has been reached. The October report shows a slight falling off in production, but it is still entirely too large. There is said to be a surplus of from 25,000 to 30,000 bbls. per day.

CHATTANOOGA.

Office of *The Iron Age*, Market and 8th Sts., CHATTANOOGA, Nov. 22, 1880.

The weather has been winter-like, and closes cold and bright. The volume of business and prices are fairly full and satisfactory.

Pig Iron.—There is nothing new in the crude metal market. The demand for Foundry may be eased off some in a few days, as Oakdale will be offering several thousand tons, a large per cent. of which is No. 1, in a few days. We quote: No. 1 Foundry, $25 @ $27; No. 2 Foundry, $23 @ $25; Gray Forge, $20 @ $22; White and Mottled, $18 @ $20; Car Wheel Metal, $38 @ $40.

Miscellaneous Articles.—Old Rails continue in full supply. We quote them at $22 @ $26; Wrought Scrap, $20 @ $24; Cast, $15 @ $17; Old Wheels, $28 @ $30.

Ores.—We quote: 50% Brown Hematite, per ton, $2 @ $2.75; Red Fossil, $2 @ $2.25.

Nails.—The Nail market continues unsatisfactory. Pittsburgh, though quoting 10¢ @ 15¢ higher, is actually making sales at $2.50 @ $2.55, 60 days. We continue our quotation at $3.10 rates, usual discount on 200-keg lots, and for cash.

Manufactured Iron.—We hear on fairly reliable authority that large bills of Bar are being offered in Cincinnati at $2.10 rates. Bar in this district continues weak. Mills are fairly full of orders, but there is little profit in the business for makers. We quote: Bar, weak at $2.40 rates; Railroad Spikes, $3; Track Bolts, $4; Trestle Bolts, $4.50; Fish Plate, $2.50.

Coal.—Run of mine to manufacturers $1.65 @ $1.75, at mills; Lump, 14¢ @ 16¢, at yard.

Coke.—Furnace Coke, $3 per ton at furnace; Foundry, 10¢ @ 12¢ per bushel.

Steel and Iron Rails.—We quote: Steel Bars at $62.50 for American makes, $60 for foreign. Iron, $48 @ $50; Small T is firm at $55.

Lead.—We quote: Pig Lead, 4½¢ @ 5¢.

Steel.—Plow Slabs, 3 in. and under, $4.70; Black Diamond, ordinary sizes, 13¢.

BOSTON.

NOVEMBER 20.—The market for raw Irons is moderately active and steady, and we continue to quote *American Pig Iron* at $25 @ $26 for No. 1 X; $20.50 @ $22.50 for No. 2 X, and $19 @ $21 for Gray Forge. These prices are f. o. b. at the port of shipment. Small spot lots will command $2 per ton higher. We quote *Foreign Iron* at $22 for Eglinton; $23 @ $24 for Glengarnock and Gartsherrie, $25 for Coltness and Langloan; and $19 @ $20 for Middlesborough. *Old Rails* are firm at $26 @ $28 for Foreign and $30 for American. *Manufactured Iron* is in only moderate demand from store. Bar is selling at $2.25 @ $2.30 and common Bolt Iron at $2.15. Norway and Swedish are unchanged at $4.15 for Bars and $5.15 for shapes. Nails are dull and weak, and we quote $2.85 for 10d to 60d. Plates are in fair demand at 3¢ for Tank, 3¾¢ for C. No. 1, 3¾¢ for C. H. No. 1 Shell, and 4½¢ @ 5¢ for C. H. No. 1 Flange. *Copper* is quiet and unchanged at 18¾¢ @ 19¢ for Lake and 18¾¢ @ 18½¢ for Baltimore. A moderate jobbing trade prevails at 19¢ @ 19½¢ for Lake and 18½¢ @ 19¢ for other brands. There has been no change in the combination prices of Manufactured Copper. We quote: New Sheathing Copper, 26¢; Braziers', 28¢, and Bolts, 28¢; Bottoms, 31¢; American Yellow Sheathing Metal, 17¢ @ 18¢; Yellow Metal Bolts, 20¢; and English Yellow Metal Sheathing, 14¢, in bond. *Lead* is quiet and unchanged, and round lots are obtainable at $4.90 ℔ cwt., and smaller parcels at 5¢ @ 5¼¢. The prices of manufactures are unchanged, as follows: Bar, 6½¢; Pipe, 6½¢; Sheet, 7¢; Tin-lined Pipe, 15¢; Tin Pipe, 40¢; all less 10% to the trade. No. 1 Solder, 11½¢. *Spelter* is quiet and steady, and we quote 5½¢ for Western, and 4¾¢ @ 4⅞¢ for Remelted. Retail lots command ¼¢ above these figures. *Sheet Zinc* is quiet at 7¼¢ @ 7½¢. *Tin* is very firm at about 21¢ for Straits, and offers of 20¾¢ for round lots have been refused. *Tin Plates* are in fair demand and prices firm. We quote Charcoal Bright at $6.25 @ $6.50, and Ternes at $5.37½ @ $5.50. Coke Tin at $5 @ $5.12½, and Ternes at $4.87½ @ $5.25.—*Commercial Bulletin.*

CINCINNATI.

NOVEMBER 22.—*Pig Iron.*—During the past week the volume of trade was only fair, consumers holding off except for immediate uses. It is conceded in every quarter that the present daily production of Pig Iron is in excess of the consumption. The increased demand that is so reasonably predicted, if it comes at all, will be fully met by an increased production from the new and old furnaces that have lately been put in blast, and from those that are very soon to go in. The sales during the past week justify the following quotations:

	4 mos.
No. 1 Hanging Rock Charcoal Foundry Extra	$27.00 @ .....
No. 1 Hanging Rock Charcoal Foundry Good	26.50 @ .....
No. 2 Hanging Rock Charcoal Foundry	25.50 @ 26.00
No. 1 Hanging Rock Coke Foundry	24.50 @ 25.00
No. 2 Hanging Rock Coke Foundry	22.50 @ 23.50
No. 1 Hanging Rock Stonecoal Foundry	23.00 @ 24.00
No. 2 Hanging Rock Stonecoal Foundry	21.50 @ 22.50
No. 1 Hanging Rock Silver Grey Softener	21.00 @ 21.50
No. 2 Hanging Rock Silver Grey Softener	20.50 @ 21.00
No. 3 Hanging Rock Silver Grey Softener	19.50 @ 20.50

Forge Irons are held at from $19 for low grades. Of Stonecoal make, Coke, $21 @ $22.50; Charcoal, $21 @ $24.

Cincinnati being the largest distributing point in the United States for Cold-blast Charcoal Car-wheel Irons, it is significant here of the actual condition of the market that the makers and consumers of these irons meet each others views at figures that are from $2 to $5 per ton below public quotations. *Bar Iron.*—Our rolling mills are all active, and are encouraged by an increase of orders in the past week, mostly for the finer qualities and from $2.15 to $2.25 card rate.

LOUISVILLE.

Messrs. GEO. H. HULL & Co., Commission Merchants, report to us as follows, under date of November 19: The market is quiet and steady. Nearly all the furnaces South which produce Mill and Foundry Irons are sold up to their capacity for some weeks ahead, and although some of them would book moderate orders for future delivery, others are declining to sell until they catch up with their orders. Most of the manufacturers in this vicinity are supplied until after January 1st, with what they have on hand and coming in. The market, therefore, is very quiet with few sales, but is firm at our quotations. No sales of Car-wheel Irons have been booked for some time, but some of the manufacturers will have to come into the market about the first of the year. We quote for cash as follows:

FOUNDRY IRONS.	
No. 1 Hanging Rock, Charcoal	$27.00 @ 28.00
No. 2 " "	26.00 @ 29.00
No. 1 Southern, Charcoal	24.00 @ 25.00
No. 2 " "	23.00 @ 24.00
No. 1 Hanging Rock, Stonecoal and Coke	24.00 @ 25.00
No. 2 Hanging Rock, Stonecoal and Coke	23.00 @ 24.00
No. 1 Southern, Stonecoal and Coke	24.00 @ 25.00
No. 2 " "	22.00 @ 23.00
"American Scotch"	23.00 @ 24.00
Silver Gray	21.00 @ 23.00
Scotch	28.00 @ 29.00
MILL IRONS.	
No. 1 Charcoal, Cold-short and Neutral	$21.00 @ 24.00
No. 1 Stonecoal and Coke, Cold-short and Neutral	21.00 @ 21.50
No. 2 Stonecoal and Coke, Cold-short and Neutral	20.50 @ 21.00
No. 1 Missouri and Indiana Red-short	26.00 @ 27.00
White and Mottled, Cold-short and Neutral	18.00 @ 19.00
CAR WHEEL AND MALLEABLE IRONS.	
Hanging Rock, Cold-blast	35.00 @ 48.00
Alabama and Georgia, Cold-blast	35.00 @ 40.00
Kentucky, Cold-blast	35.00 @ 40.00

W. B. BELKNAP & Co., Iron and Steel Merchants, Nos. 113 and 115 Main street, report to us as follows under date of November 20: Business during the past week has been exceptionally active for this season of the year. Demand is most noticeable on fire-bed and light Sheet, on which there has as yet been no concession of price to speak of. A sudden cold snap has brought about a call for winter goods, and the threatened suspension of navigation above, on account of low water and freezing, is accelerating buying somewhat of Pittsburgh goods. A general belief in the future prevails, and a heavy business is predicted for January.

NEW ORLEANS.

Messrs. MINNIGERODE & Co., dealers in Railway Supplies, 61 St. Charles street, write as follows under date of November 19: Our market continues very firm on all grades of iron, and business is very brisk. We do not note any special advance in prices of new material, except that English Iron Rails are from $1.50 to $2 higher than 10 days ago. The inquiry for raw material is very active, and prices generally have shown advances over last week. The outlook for a large business is encouraging.

ST. LOUIS.

Messrs. CARD & HOFFER, Pig Iron and Iron Ore Merchants, 417 Pine street, write us as follows, under date of November 20: A good business has been done during the last few days. Week closes with prices stronger than for some time past.

HOT BLAST CHARCOAL.	
Missouri	$26.00 @ 27.00
Southern	25.00 @ 26.00
Hanging Rock	29.00 @ 30.00
COKE AND COAL.	
Missouri	25.00 @ 26.00
Southern	25.00 @ 26.00
Ohio	26.00 @ 27.00
MILL IRONS.	
Cold-short	22.50 @ 23.50
Red-short	24.00 @ 25.00
CAR WHEEL AND MALLEABLE IRONS.	
Missouri	30.00 @ 35.00
Southern	38.00 @ 40.00
Ohio	36.00 @ 45.00
ORE.	
Ore for fix	10.00 @ 12.00
For furnace	6.50 @ 7.50
Brown Hematites	no market.

BALTIMORE.

W. N. WYETH, Iron and Steel Merchant, 46 and 48 South Charles street, reports us the following, under date of November 22: Trade for the past week has ruled only moderately fair, and will doubtless continue so until about the first of the coming year:

Ref. Bar Iron, 1 to 6 by ⅜ to 1	℔ lb	2½ @ 2¾¢
" " 1 to 4½ by 1⅛ to 2	℔ lb	2½ @ 2¾¢
" ⅜ to 2, Round and Square	℔ lb	2½ @ 2¾¢
Hoop Iron, 1½ wide and upward	"	3½ @ 3¾¢
Band Iron, from 1¼ to 4 in. wide	"	3 @ 3¼¢
Horse-shoe Iron	"	3¾ @ 4 ¢
Norway Nail Rods	"	6¼ @ 6½¢
Black Diamond Cast Steel	"	13½ @ 14½¢
Machinery Steel	"	9 @ 9½¢
Cast Spring Steel	"	8 @ 8½¢
Common Horse Nails	"	10 @ 14 ¢
Perkins' Horse shoes, ℔ keg of 100 lbs		$4.37½
" Mule shoes		5.37½

		10	9	8	7	6
Putnam Horse Nails	℔ lb	21	22	23	24	26¢
Globe Horse Nails	℔ lb	20	21	22	23	25¢
Railroad Spikes				3	@	3¼¢

Less list discount to the trade.

RICHMOND.

Mr. ASA SNYDER, Iron Merchant and Furnace Agent, writes as follows under date of November 22: Market firm at quotations, but sales less active.

Scotch Pig Iron	$25.00 @ 28.00
American Scotch Pig Iron	28.00 @ 29.00
No. 1	27.00 @ 29.00
No. 2	21.00 @ 24.00
No. 3	20.00 @ 22.00
Mottled and White	19.00 @ 20.00
Virginia Charcoal Wheel Iron	36.00 @ 40.00
Old Rails	26.00 @ 28.00
Wrought Scrap, No. 1	23.00 @ 24.00
Cast, Machinery Scrap	21.00 @ 22.00
Richmond Refined Bar Iron	2.6 @ .....
Horse Shoes, Tredegar	..... @ 4.00
Mule " "	..... @ 5.00
Old Dominion Nails	..... @ 3.25

For lots of 200 kegs, 10¢ per keg less.

Our English Letter.

Review of the British Iron, Steel, Metal and Hardware Trades.

(*From our Regular Correspondent.*)

LONDON, ENG., November 8, 1880.

THE TRADE OUTLOOK

is fairly bright, the slight change for the better noticed a week ago having been pretty well maintained since the date of my last letter. The improvement does not amount to much, it is true, but the mere impression that matters are not growing worse is sufficient to give us cause for thankfulness, if not for positive jubilation. At the present time and under existing conditions we are in the mood to be thankful for small mercies. The present relief is a sample of the smallness of such "mercies." I don't think it would be possible for any writer or speaker to definitely specify the reasons which have led to the improved tone of the markets here. It is sufficient to observe that such a tone really exists, without manifesting a disposition to analyze its component parts too closely. Perhaps the general commercial situation has helped along the iron trade, and has led those most deeply interested therein to form the impression that they are not less likely to feel the effects of any general revival than their fellows. The plentitude of money, to which I alluded some weeks ago, is a circumstance which is beginning to attract increased and more thoughtful attention here. Many millions—perhaps as much as £50,000,000—lie in the banks on deposit at 1 and 2 per cent., with few new openings for investment which yield more than 4 per cent., and speculation on foreign loans and the like class of "wild-cat" operations is absolutely dead for the time being. That being the case it is, perhaps, not surprising that consols rose during last week to 1/16 @ 1/8 above par, a level which had not been reached since the year 1853. These consols are government stock, bearing interest at the rate of 3 per cent. only; hence it is plain that there must be a great dearth of paying investments to send them up so unprecedentedly high. This vast accumulation of capital mostly lies at call, and would of a certainty be largely forthcoming in support of all sorts of schemes should the public once form the impression that a general revival of business had set in. Such a reserve fund, as it were, has its good points and advantages, but it is not without its drawbacks. It is always liable to be thrown into the market rashly, and pitchforked into reckless adventures which are often started and run for a time in direct competition with the old established and prudent traders. That was the case in 1871–3, when iron works and collieries were set going by the company promoters to such an extent that those industries have been suffering ever since from the overproduction and excessive competition thereby engendered. At present there are few temptations in a similar direction, but there is no axiom so true as that which alleges that fools never learn wisdom by experience, so that, given the same premises, we might look forward to precisely the same conclusions as on previous occasions. A small proportion of this superfluous capital is probably finding its way into the iron market in the shape of purchases of Scotch warrants, but the amount cannot be large, or we should have witnessed a more marked rebound in the quotations for that class of paper. Warrants, I may say, are now regularly quoted in the newspaper reports of the London Stock Exchange, and I believe the brokers and jobbers look upon them as affording an excellent medium for rapid movements—of the shuttlecock order. If your proposed Pittsburgh stores should be established, you may expect something of the same kind on your side of the Atlantic. Such stores are highly useful, but the paper they issue is occasionally made the source of mischief. As I stated at the outset, there has been a rather better feeling in the trade during the week, almost all classes of iron, whether crude or manufactured, being held at about last week's prices, but with more cheerfulness all round. The Scotch makers are doing a heavy business on account of their own malleable and other iron works, which fact operates as a counterpoise against the comparative smallness of the pig iron shipments, which compare badly with the figures for the corresponding period of last year. The production is still increasing, as are the stocks, but the smelters appear to have every confidence in the future of the industry, and continue to pile up the iron irrespective of the current demand. In the Cleveland district the make is exceedingly large, but the shipments are in proportion, and the unsold stock does not increase very seriously. These shipments, however, may be considered at an end for the season so far as the Baltic and Northern seas are concerned, our reports thence notifying much ice and the practical closing of the navigation. This stops all shipments to Russia and parts of Germany, &c., direct, but does not necessarily cut off those countries entirely, seeing that a good deal of iron for Germany will be sent *via* Rotterdam, and thence up the Rhine into Westphalia, Rhineland, &c. On the West Coast and throughout the remainder of the country pig is quiet, and the best sorts are being ousted in a large measure by commoner brands, which "come in" much more cheaply for a great variety of purposes. In merchant irons everything rules steady, most of the newer orders being in respect of the second rate and common kinds. In hoops, sheets, wire and wire rods there is a steady business doing, a fair proportion of the orders being from manufacturers on your side. I am credibly informed that, not long ago, a considerable tonnage of iron wire rods and billets were bought in this country on behalf of your wire and screw manufacturers at prices which were virtually lower than your own. A quantity of Westphalian wire rods was bought about the same time. I am told that the parties to both transactions have been so well satisfied that they have just repeated the orders. As a matter of fact, the Germans are sending us also a good deal of iron of the kind just indicated, and are enabled to undersell our own makers "on their own doorsteps," chiefly owing to the heavy railway freights which so seriously handicap all inland manufacturers who have to compete against foreign producers who have the advantage of cheap water carriage down to the sea, and thence low freights into London, Hull or other ports. Some day or other, perhaps at no distant date, the whole question of railroad rates for merchandise will need overhauling with a view to giving the State either supreme administrative control over, or the actual possession of, the whole of the lines in the country. The subject is not well understood, but there is much "smothered" indignation, which will some time burst forth in flames of agitation. While on the railroad theme I may perhaps be permitted to say that certain paragraphs and reports which have appeared within the past few days in the English papers, as to purchases of 50,000 tons of rails by Mr. Vanderbilt, are obviously only hashed up from one of my letters of about a month ago. I write from memory, but I believe I only stated that the junior commodore had bought 15,000 tons, and added that he was understood to have purchased 50,000 or 60,000 tons while in Europe recently. Upon this the new edifice has been erected by some enterprising liner, whether on this or your side I do not pretend to know. The *rechauffe* is ingenious to say the least. I may, however, add for your information that very considerable quantities of steel rails have recently been ordered in Europe by your railroad magnates and corporations, Mr. Vanderbilt among them. Besides the Cammell order, spoken of in my previous letters, contracts have been taken by the Krupp Works, of Essen, and by the Actien Gesellschoft Phœnix, of Laar-bei-Ruhrort, to the tune of 30,000 to 40,000 tons. The report that the Rhenish Steel Works, of Ruhrort, participate is not correct, but I am not able to speak positively as to the Union Iron and Steel Works, of Dortmund. Prices range from £5. 10/ to £6. 5/ at works, and deliveries are spread over much of 1880–1.

SCOTCH PIG IRON

has remained steadily quiet since the date of my last letter, with a good home business, but only a moderate number of shipping transactions. There are now 119 Scotch furnaces blowing, as against 95 this date last year. In Connal's stores there are 477,067 tons compared with 364,591 a year ago. To date the shipments show an increase of 90,140 tons over those for 1879, the last few weeks' decreases having largely pulled down the previous highly favorable comparison. Last week's addition to stocks was 627 tons. Pig iron for ballast is quoted at 45/ per ton alongside ship in Forth or Clyde. The importations of Middlesboro' pig into Grangemouth again fell off last week, the total comparative decrease to date being set down at 5407 tons on a total of 214,638 tons. Writing from Glasgow November 5, James Watson & Co., said: The iron market has been quiet this week without much change in price and only a moderate business transacted. On Monday the price drooped from 51/4 @ 50/10½, rallying however at the close to 51/1 per ton. On Tuesday the improvement continued from 51/ @ 51/3½ cash, closing quieter at 51/1½ per ton. On Wednesday the market opened firm at 51/3 gradually receding to 50/10 cash. Yesterday the opening was flat, the price dropping to 50/8 cash, and in the afternoon business was done from 50/7½ @ 50/9½ per ton. To-day the tone was firmer, with a good business done from 50/10½ @ 51/3 cash 8 days, closing sellers 51/2, buyers 51/1½ per ton. The shipments last week were 7556 tons, as compared with 17,000 tons for the corresponding week of 1879." We quote:

	No. 1.	No. 3.
G. M. B., at Glasgow	52/	50/
Gartsherrie, at Glasgow	62/	54/
Coltness, "	63/	54/
Summerlee, "	58/6	51/
Langloan, "	62/3	53/6
Carnbroe, "	55/6	53/
Calder, at Port Dundas	59/	51/
Glengarnock, at Ardrossan	56/	53/
Eglinton, "	52/6	50/6
Dalmellington, "	53/	51/
Shotts, at Leith	62/6	54/

The figures of John E. Swan & Bros., Limited, closely approximate with these. Last weeks' exports from the Clyde included £38,000 worth of iron, machinery and metals.

THE BOARD OF TRADE RETURNS,

issued to-day, are not by any means unfavorable as a whole, although there are several items in which the comparison with last year is not quite so good as some persons appear to have expected. This remark holds good as regards certain classes of iron, but it must be remembered that a year ago we were sending iron and steel to your ports with almost unprecedented recklessness, whereas the transactions of last month were principally *bona fide*. This fact borne in mind, the statistics show to fair advantage, and may be said to again prove that we are still doing a highly respectable turnover in all our leading manufactures. The imports during the month were of the aggregate value of £27,436,060, as against £32,316,565 in October, 1879, and £29,582,303 in October, 1878. This decrease is decidedly in our favor, and has arisen from the lessened purchases of corn and other breadstuffs. During the 10 months ending November 30, however, we have imported to the value of £337,343,822, as against £292,462,797 last year to the same date. The export returns are still ahead. Last month the total value of British and Irish manufactures and produce exported was £18,685,060, against £17,699,432 last year. For the 10 months the figures are—this year, £185,731,037; last, £157,875,597.

The principal articles in which your readers are interested are:

Articles.	Month of October. 1879.	1880.
Firearms (small) No.	19,621	26,390
Gunpowder, lbs.	1,333,468	1,597,186
All other kinds of ammunition, &c., £	57,196	79,566
Brass manufactures, cwt.	9,245	7,539
Railway pass. carriages, No.	2	14
Railway goods, wagons, No.	41	238
Coal, coke, fuel, &c., tons	1,471,171	1,659,866
Copper, unwrought, cwt.	37,516	37,669
" wrought, cwt.	28,804	30,934
Mixed or yellow metal sheathing, cwt.	29,861	29,533
Glass—Plate, &c., sq. ft.	174,330	160,583
" flint, cwt.	7,248	11,254
" do. bottles & green, &c., cwt.	56,832	54,830
Glass—Other manufactures, cwt	11,601	12,207
Hardware and cutlery, £	268,210	332,126

Iron—Pig, tons	184,486	118,213
Bar, angle, rod, bolt, tons	22,314	22,189
Railroad, all sorts, tons	44,977	55,310
Wire (except telegraph), tons	4,640	5,866
Hoops, sheets, boiler, &c., plates, tons	17,049	30,181
Tin plates, tons	17,812	20,044
Cast or wrought, &c., tons	21,283	20,053
Old, for remanufacture, tons	36,816	6,570
Steel, unwrought, tons	2,900	4,802
Manufactures of iron and steel combined, tons	1,098	1,184
Lead, all, tons	3,322	3,224
Machinery & millwork—Steam engines, £	169,020	219,988
Other sorts, £	558,593	630,652
Plated, &c., wares, £	21,207	25,307
Telegraphic wires and apps, £	412,201	64,030
Tin, unwrought, cwt	12,094	3,954
Zinc or spelter, all, cwt	7,745	12,135
Special return—Iron rails, tons	8,226	6,703
Steel rails, tons	49,595	40,444

EXPORTS TO UNITED STATES

during last month are shown in the subjoined table, and compared with the same month of last year as well as with September this year:

Article.	Month of October, 1879.	Month of October, 1880.	Month of September, 1880.
Alkali, cwts	315,938	245,766	200,117
Hardware and cutlery, £	33,693	47,076	42,663
Iron—Pig, tons	87,491	14,705	26,061
Bar, angle, rod, &c., tons	2,242	1,977	1,170
Railroad, all, tons	6,468	17,716	14,531
Hoops, sheets, plates, &c., tons	893	2,583	2,184
Tin plates, tons	14,345	14,208	13,865
Cast or wrought, tons	826	1,436	2,983
Old wrought, tons	3,705	4,166	4,571
Steel, unwrought, tons	721	2,623	1,304
Lead, unwrought, tons	165	.....	2,975
Steam engines, £	100	.....	80
Other machinery, &c., £	15,006	28,890	25,612
Tin, unwrought, cwts	4,100	1,364	422
Special Return—Iron rails, tons	5,971	3,573	3,880
Steel rails, tons	481	14,092	10,052

These figures amply corroborate the trade reports which have from time to time appeared in my letters. They show that in pig iron and old iron we have done much less with you, while in steel rails there has been a marked increase, which has more than compensated for the falling off in iron rails. Tin plates, you will notice, have been almost stationary.

CLEVELAND PIG

is in heavy request, especially for use in the district itself, where there is at the present time greater activity in almost every leading department than has ever before been known. This is particularly true of the plate and angle mills, which are doing a very large turnover. From Eston, blooms and rails are being sent to the United States, whither a few lots of pig are also going from Bell Brothers' Clarence Works. The monthly returns of the Cleveland Ironmasters' Association for October show the following condensed particulars: Make of Cleveland Pig Iron.—Month ending October 31, 1880, 175,881 tons; increase upon September, 1880, 9091 tons. Make of other kinds of iron.—Month ending October 31, 1880, 46,216 tons; decrease upon September, 1880, 1018 tons. Total make, October, 1880, 222,097 tons; increase upon September, 1880, 8073 tons. Shipments (Foreign) of pig iron from Port of Middlesborough.—Month ending October 31, 1880, 44,855 tons; corresponding month last year, 48,031 tons; decrease upon October, 1879, 3176 tons. Shipments (coastwise) of pig iron from Port of Middlesborough.—Month ending October 31, 1880, 41,195 tons; corresponding month last year, 45,932 tons; decrease upon October, 1879, 4737 tons. Makers' stocks of Cleveland iron, October 31, 1880.—Port of Middlesborough, 86,877 tons; total of district, 119,121 tons; increase upon September, 1880, 253 tons.—Stock in warrant stores.—Public stores, September 30, 1880, 117,428 tons; October 31, 1880, 128,913 tons; makers' stores, September 30, 1880, 47,414 tons; October 31, 1880, 50,894 tons. Net increase in stocks and stores, 15,218 tons.

Current prices are (net cash f. o. b. Tees):

No. 1 Foundry	44/6	No. 4 Forge	38/6
2 "	42/	Mottled	38/
3 "	39/6	White	37/6
4 "	39/	Kentledge	43/

WEST COAST HEMATITES

are fairly balanced, but there are suspicions that in some quarters the process of shading is being liberally carried out. The undernoted figures are liable to lose 2/6 @ 5/ per ton when they are put in the scale with respectably proportioned orders:

	No. 1.	No. 2.	No. 3.
Cleator	72/6	71/	70/
Lonsdale	66/	65/	64/
Workington	66/	65/	64/
Lowther	66/	65/	64/
Moss Bay	66/	65/	64/
Harrington	66/	65/	64/
Solway	66/	65/	64/
Maryport	66/	65/	64/
Askham	65/	64/	63/

I notice that a firm of Sheffield steel manufacturers are advertising for 5000 tons of Bessemer hematite pigs—a circumstance which would seem to show that the firm have every confidence in the "good old ways" which held unquestioned sway prior to the advent of the Thomas-Gilchrist dephosphorization project and its patronage of common phosphoriferous pig iron.

FROM SHEFFIELD

the news ought to be excessively good, in a negative sense, showing how extremely brief it is. Sheffield is, therefore, to be congratulated for having next to no contemporary industrial history. Perhaps the historians are lazy, or lack the materials of which all authentic history is composed. I have often alluded to the splendid rail mill of John Brown & Company, and have expressed my regret that so fine a mill should so long lie idle. I am, therefore, the more gratified to learn that the building in question is to be utilized for rolling plates, the demand for which is so strong at the present time as to warrant the change. The steel trade is fairly engaged—on American orders for the most part. Almost the whole of the cutlery manufacturers are well employed—indeed, the evidences of activity grow more numerous and convincing every succeeding week, and the remainder of the year is likely to be prosperous.

FOREIGN.

FRANCE.

(Moniteur des Interets Materiels.)

PARIS, Nov. 7, 1880.—*Metals.*—While business in general has been rather looking up and the demand for metals with it, the situation of Iron has, on the contrary, grown worse. *Copper* has been doing well, improving 2.50 francs. We quote: Chili Bars, 162.50 @ 165; Ingots and Slabs, 167.50; Best Selected, 170; and pure Corocoro Ore, 165 francs the 100 kilos. *Tin.*—An advance of 7.50 francs has taken place since our last. We are, therefore, now able to quote Banca and English 245, and other sorts 242.50. *Lead* has also improved 1 franc. We quote the same, 38.50 @ 39.50. *Spelter*, on the other hand, has given way 50c. @ 1 franc, and we cannot quote the same any higher than 43.50 @ 44 francs. *Iron.*—Certain dealers here have been offered Merchant Iron, delivered here, at 16 francs per 100 kilos., from the North, which would be equal to 15 francs at the works. This is a low price. In the Haute Marne Coke Tin is sustained at 18 francs and Mixed at 20 francs, with a difference between classes of 5 @ 10 francs. The works were still kept tolerably busy, but it was apprehended that high water would do some mischief. The Iron situation in France in general is not encouraging. On the contrary, it is well calculated to spread uneasiness among makers, in view of the apparently irresistible decline we are witnessing. *Coal.*—Activity in this branch is well maintained. Orders are becoming more considerable daily, but prices remain the same. Shipments at St. Etienne have again been larger than the previous week.

BELGIUM.

(Revue Universelle.)

BRUSSELS, Nov. 7, 1880.—*Iron.*—Nothing has happened to essentially modify the Iron situation in Belgium. Producers feel no particular anxiety to sell at cost, while consumers say that their profits are so insignificant that they cannot go on paying current rates for the raw material. Rolling mills and some other works, however, still remain tolerably busy. This, we are sorry to say, is not the case with blast furnaces. We are, therefore, led to presume that some of them will prefer to cease operations. Very soon some may be blown out. They get for Affinage Pig, 5.50 francs per 100 kilos, and for Moulage, 6.50 @ 7. The machine shops do not complain, nor do the steel works. Bolt and hardware manufacturers have got a steady amount of work on hand, but at very moderate prices. They insist that they still have to pay their iron too high. Prices in general have been sustained since our last report but the feeling lacks all strength in the face of the state of affairs in our immediate neighborhood; another week will probably decide. *Coal* has continued to do very well within the range of 11.25 francs to 19 francs as extremes, and Lump Coal at 22.50. Coal for households has been in active request during the week, with an upward tendency. Stocks at the mines have diminished at such a rapid rate that in some quarters they have been exhausted. Coal for engines is in less request. The general outlook is a strong one.

GERMANY.

(Borsenhalle.)

HAMBURG, Nov. 6, 1880.—*Iron.*—Our Dortmund correspondent writes: "No improvement is as yet perceptible in the Iron trade; on the contrary, the dull tendency is getting to be intensified. This is chiefly due to the circumstance that orders for Merchant Iron are light and that the demand for Sheet Iron is also less active, in consequence of which concessions have to be made. In Steel Rails there is, however, a better feeling, for several large makers have received orders of note from America, and the adjudications for German railroads now pending will embrace 24,000 Steel Rails and 7100 tons of Iron sleepers. The demand for *Coal* is meanwhile enormous, so much so that a general rise in prices seems inevitable in all the present month. Some mines have advanced prices 2 @ 3 marks per 100 cwts. and upward. Coal transportation per rail is unusually active, particularly since the Rhine has become so turbulent that the stoutest tugboats dare not confront the high waves." News from the Silesian Iron districts is unfavorable so far as Merchant Iron is concerned, now currently selling as low as 10 marks the 100 kilos.—the lowest price during the period of greatest depression previous to the revival in the fall of 1879. Pig Iron is still in some demand; besides it can be stored more easily and money obtained on it; hence it is better sustained in value. Nothing will raise the general Iron situation in Silesia but export or curtailment of production, and nobody has resorted to the latter yet. There is no particular change reported from the Moselle and Sarre region, so far as Iron is concerned; the sale of coal there is steadily on the increase at 7 @ 9 marks per ton for Sarre Coal. In the lower Rhine and Westphalian districts Iron remains dull, while Coal is in good request at partially higher rates. *Metals.*—Our market has been moderately active at partially higher rates, except Spelter, which remains unaltered. We quote Drontheim Copper, 70 @ 71 marks per 50 kilos.; Banca Tin, 93 @ 94; German Pig Lead, 16.50, and Silesian Spelter, 18.25 @ 18.50 marks the 50 kilos.

HOLLAND.

(Koch & Vlierboom.)

ROTTERDAM, November 5, 1880.—*Tin.*—Business has been tolerably active, but mostly on speculation, consumers not being very anxious to subscribe to ruling rates. We quote at the close: Banca, 54 guilders per 50 kilos., and Billiton, 53.50. At Amsterdam the latter is bringing 53.75 guilders.

AUSTRIA.

(Austrian Trade Journal.)

VIENNA, Nov. 5, 1880.—*Iron.*—No improvement has occurred during the week, although there has been greater steadiness than during the preceding fortnight, due to the good demand from machinists and other Iron workers. These classes of consumers are kept tolerably busy, but their demand does not suffice to absorb the amounts turned out all along by makers. There seems to be greater readiness to take hold, however, at current reduced figures. During the coming month of December makers will have to make up their minds whether they will renew their combination or not, for the agreement will then expire and their resolution will to a considerable extent shape the course of the market and prices thereafter. In Hungary the unsettled condition of the Iron market continues; the only thing becoming evident is that the lower prices have begun to stimulate a greater demand from consumers. Iron has been inactive at Vienna, Merchant Iron being particularly dull. We quote Pig, 50 @ 60 florins per ton; Merchant Iron, 105 @ 120; Sheet, 160 @ 190, and Pillars, 123 @ 125 florins. *Metals* have undergone no further change since our last report.

CHILI.

(Ferrocarril.)

VALPARAISO, Sep. 24, 1880.—*Copper.*—A good business might have been done if holders of Copper had been willing to take in payment sterling bills, at the ruling exchange, but this they declined. Aside therefrom the European cable news was not particularly encouraging, and our market lacked animation in consequence. Sales only 1800 quintals at $21.46 per quintal on board at Totoralillo, with an exchange of 25¼d. per dollar, and 180 quintals at $23 on shore here; of Regulus a lot was taken at $10.50, with 25¼d. as a basis by our smelters. Nothing was done in Ore. The nominal quotations at the close were for Copper, $20.75 @ $21.15; Regulus, $10.50, and Ore, $4—on board. *Nitrate.*—In consequence of unfavorable advices from Europe, only a few small cargoes sold at $4.20 @ $4.40. The Senate reduced the export duty to $1.60 per quintal, yet to be approved by the chamber of deputies. Sales 72,000 quintals, 95 @ 96% at $4.20 @ $4.42; exchange, 25d. *Exchange.*—Banks have fixed the same to-day at 25⅜d. for 60 days', and 25⅛d. for 90 days' sight drafts on London, per dollar. P. S.—At the close, 2207 quintals. Copper in Bars still sell at $21.15 on board at Guayacan. Available tonnage, 20,749 tons British, and 19,165 tons other flags.

EAST INDIES.

(Schmidt, Kustermann & Co.)

PENANG, September 27, 1880.—*Tin.*—Prices during the fortnight under review have been kept above London parity, chiefly in consequence of the American demand. The market opened at $26.25 per picul, then receded to $25.50, and finally recovered to $25.90, at which rate some few sales were effected, total sales summing up 3700 piculs for America, and 800 piculs for the East. Stock in Bazar reduced to 1000 piculs all told. *Exchange* has been fully sustained, closing with a decidedly firm tendency, at 3/9¾, 4 months' sight Bank drafts on London.

Some Scraps of Early Stove History.

The Troy *Whig* prints the following: The introduction of stoves is so new that it has scarcely any literature besides its advertisements. Nowhere in the language is there a handbook showing plainly and clearly what the nature of a stove is and what facts in heating have been established, and the conflict of patents and of personal opinions at the present day makes it as difficult to tell now what truth is as it was 2000 years ago. We do, however, clearly know that there were no stoves in Greece and Rome. Cicero never knew the delight of a coal fire, and though Demosthenes was a man accustomed to pebbles as an article of diet—was, in fact, the Great Orginial Stone Eater—he was unacquainted with the taste of a broiled beefsteak. Their fires were furnaces, and the stove pipe, as well as the chimney, was unknown. Indeed many people would be surprised to learn how recently the latter has been introduced. Richard Cœur de Leon and Rudolph of Hapsburg never saw one, and the houses which are still standing that were built 500 years ago have no arrangements by which they could have been heated. Fire was then made in the center of the room. By removing the fuel to the side of the chamber, and making a recess there, a better draft and ventilation was secured, but heat was lost. Much of it escaped into the outer air.

The introduction of stoves must have rapidly followed that of chimneys in Germany, Denmark and Sweden. But in England they are little used, and have not there won a place in the affections of the people. It was in the United States, the land where the summers are as warm as those of Naples and the winters as cold of those of St. Petersburg, that this useful invention was to be improved and perfected. Necessity is the mother of invention, and we quickly experienced the truth of the adage. Dr. Franklin describes in his autobiography how his attention was attracted to the matter, and what he did in the way of improvements. It was in 1745 that he brought out his novelty, which proved so advantageous that some specimens are in existence up to the present time. The plan was a rectangular box of cast-iron plates, open in front, except near the top, with a sliding shutter by which the whole might be closed entirely or in part, either for safety or increasing the draft; the hearth projected in front, and was cast with double ledges to receive the edges of the upright plates, and also with a number of holes. Of those one was in the front part, with a regulating valve for admitting air to the fire by an air flue from beneath, when the shutter was down; one under the first upright plate in the back for discharging the air brought under the hearth from without into a narrow, rectangular box that was as long as the width of the stove and as high, excepting the space for the smoke flue over its top; it had also three near the extreme back edge for the smoke, after it had passed over and descended behind the air box to enter the flue leading into the base of the chimney. The air box at its sides was furnished with holes through which the heated air was admitted into the room, and a succession of shelves, one above another, was provided in this box, reaching not quite across, by which the circulation of the air was extended, and it was longer exposed to the heated surfaces before passing out into the room. The back plate of the stove, heated by the descending smoke flue, imparted heat to the air between it and the chimney, the stove standing a little out from the wall. A register of sheet iron was introduced in the descending flue, which could be closed wholly or in part and check the fire to any desired extent. Thus this invention embodied the principles of the modern air-tight stoves, and the directions Dr. Franklin gave for using it are just as applicable to these, though, by reason of its ruder workmanship, the joints are not air-tight, which the inventor himself remarked, and supposed could not well be otherwise. This stove was ornamented in front by a representation of the sun, near which were the letters intended for its name, *Alter Idem*.

In 1771, Dr. Franklin, while acting as the agent of the Pennsylvania and some other North American colonies in England, designed a stove which should consume its own smoke when burning bituminous coal. It was a vase-shaped iron vessel for receiving the fuel, set upon a horizontal grate, and beneath this was a large box of cast iron, furnished with partitions, which caused the flame and smoke drawn down the grate to circulate around until they finally escaped into the chimney by a flue at the bottom on each side. With the same object of consuming the smoke he also invented a basket or grate or cage, with movable bars at the top and bottom, the fuel being at the top and kindled. The cage might then be turned over upon pivots, which supported it by the center.

The name of Count Rumford afterward became celebrated for the improvements which he introduced in stoves, especially those designed for culinary purposes. He gradually reduced their dimensions, and contrived that most important feature of all cooking stoves, of arranging a number of pots and boilers over the flues proceeding from a single fire, and the method of roasting meats in ovens of sheet iron, without the viands acquiring a disagreeable taste, a gentle current of air being allowed to circulate throughout the ovens.

Dr. Franklin, among his other alterations, lessened the size of the pipe for leading away the smoke. He had made the discovery that too much heat went up the chimney, but he could not completely obviate the difficulty; nor, indeed, have his successors. The history of an art is a history of continual experiments, and it needs time to determine many points. We are applying ourselves to their solution, but we should award all honors to the pioneers of science who led the march of discovery. We do more because our opportunities are greater.

Mechanics as a Science.

Although no department of science—no portion of the advancement of civilization that takes us further from barbarism—is so marked in its triumphs and so certain in its beneficial results as that devoted to mechanics, it is a fact that it does not receive its proper approval or proper reward. It is really true that the mechanic is to-day paid much less for his labor, and very much less for his ideas in practical form, than others who merely reproduce and adapt the facts and settled opinions of their predecessors. The physician, the lawyer and the theologian charge and receive for their presentation of long ago acknowledged axioms, and even of new theories, handsome returns for their trouble. They are acknowledged necessities, while the mechanic is a sort of hanger-on to our civilization—a camp follower, with no recognized rank, and merely allowed place that he may prove his fitness. Certain perquisities follow the lawyer, the doctor of medicine, and the theological instructor, all of which are lacking in the case of the mechanical engineer. It is unnecessary to refer to the chances of the lawyer for rich legal fees; to mention the opportunities of the physician with his rich and hypochondriac patients; and the recognition of the religious instructor, with his faculty of dealing with the doubtful, the troubled and the despairing. From these prolific sources these professors draw their incomes, and generally without question as to their individual fitness.

But the mechanical engineer, the adapter of theoretic science to practical utility, has no such resources, and even his legitimate income is limited and its amount frequently disputed. Yet he deals with facts and realities, and not with problematical hypotheses and impractical theories. When he gives an opinion or reports a diagnosis, his statements are based on unvarying laws, which are well understood by those of his profession who are competent. On his opinion vast enterprises, involving the labor of hundreds of men for years, and the expenditure of thousands of dollars, are readily undertaken by capitalists, and it is rare that they or the poorer stockholders find themselves wrong in depending on his acumen and scientific knowledge. In short, the professional opinions of the mechanical engineer are worth all that is paid for them, seldom misleading, rarely extravagant, generally reliable. Can as much be said with truth of the professional advice of others?

Men possessing these qualifications, and on whose opinions such vast enterprises rest, ought to be well paid. It costs much in time, labor and money for a lover of mechanics to become an expert—one whose opinion and direction may be accepted as absolutely reliable, and after the groundwork of theory has been prepared there is a long novitiate of practical service before the mechanical engineer can assume the position of director. It may be said, with entire truth, that in no profession are the exactions preparatory to profit so many and the time of apprenticeship so long.

The opinions of the lawyer are subject to revision and reversal by a higher authority; those of the theologian are contracted and disputed by a hundred differing sects; those of the physician have other schools to deny their conclusions, and at best are but individual ideas, liable to be set at naught by another practitioner. But the opinions of the mechanical expert are based on known and proved facts, and are similar to those of every other competent expert. On such opinions the success or failure of vast industrial enterprises may be predicted, and on them are safely risked millions of money in untried experiments.

Iron Ore in Utah.

At the recent meeting of the National Academy of Sciences, Prof. J. S. Newberry gave a description of some iron ore deposits in Utah which he had examined recently.

The quantity of iron ore in Utah, Dr. Newberry said, was such as to throw into the shade all other known deposits in this country. He had seen enough lying loose during his short tour in the southern section of that Territory to keep all the furnaces in the United States in operation for a hundred years. One of the most striking iron deposits upon which his eye had ever rested consisted of a group of hills, from 1000 to 2000 feet high, which were penetrated to a great depth with parallel veins of iron ore. As one crosses the valley of which these eminences formed a local boundary, they are identifiable from a distance of five or six miles as masses of metal. The magnetite gives the range the appearance of mountains of coal. One of these hills rose to a greater hight than the rest, and in this the iron ore was disposed in strata as exactly parallel to each other as lines could be drawn upon the blackboard. While the prevalent ore in this region was magnetite, it was, nevertheless, interspersed with abundant masses of hematite, and there were many points where the two were intimately intermixed. As one journeyed from point to point in this region the surface was found to be strewn with bowlders and broken masses of iron ore. He remembered such a mass about 12 or 15 miles south of Iron City, which was 1000 feet long by 500 broad and 200 feet high—a vast castellated crag of black magnetite. Prof. Newberry had found abundant evidence in their fibrous structure of the sedimentary origin of many of these deposits. Metamorphism had gone on here upon a giant scale. Anywhere one might pick up vast masses of natural lodestone. The variety of structure was also surprising. Here was a mass as solid as cast iron; near by was a mass that was soft, decomposed and stained blood-red. Within six to ten miles of this vast deposit of iron was an abundance of the best of coal to work it, so that one could stand on the brink of an iron hill and look down upon coal enough to convert it. Prof. Newberry, in concluding his essay, predicted a great future for this region.

The fourteenth annual convention of the American Institute of Architects was held in Philadelphia recently.

The Electrolytic Determination Silver.

It is generally known that silver can be precipitated in a compact metallic state from the solutions of silver cyanide or chloride in potassium cyanide by means of the electric current. As far back as 1865, Luckow, who introduced the same method for copper, demonstrated that silver may be quantitatively determined in this manner. He pointed out at the same time that electrolysis may be made available in other manners for the quantitative determination of silver; either (1) by the reduction of chloride of silver at the negative pole, or (2) by the separation of the silver from a neutral solution of nitrate of silver. Concerning the latter process Luckow states: "If the current from two Meidinger elements is conducted through a neutral dilute solution of nitrate of silver, metallic silver in a spongy state is deposited on the platinum capsule which forms the negative pole, while at the same time the edge and the lower surface of the platinum disk forming the positive pole is covered with fine black needles of peroxide of silver, which, however, disappear almost entirely on prolonged action of the current. If, when all the silver has been deposited, the supernatant liquid is decanted off, the separated metal is repeatedly washed with water, dried sharply, and the capsule weighed; the increase of weight gives the proportion of silver in the liquid a little too low. The loss is due to the fact that a small quantity of silver is deposited on the disk of the positive pole, owing to the reduction of the peroxide."

In a more recent paper on the application of the electric current in analytical chemistry (*Zeitschrift für Anal. Chemie*), Luckow states: "Silver is precipitated by the electric current from solutions containing not more than eight to ten per cent. of free nitric acid, in a very bulky metallic state; at the same time a little peroxide is deposited at the positive pole, the formation of which may be prevented by an addition of glycerine, milk, sugar, or tartaric acid." No further information has been published on the electrolytic separation of silver from nitric solutions. In accordance with Luckow, Fresenius and Bergmann observe that silver can be easily and completely precipitated from nitric solutions, whether neutral or containing free acid, but that it is disposed to take a spongy or flocculent form, so that it easily falls off from the electrode and can not be readily weighed. The precipitate assumes this spongy state, especially when it has been deposited from a somewhat concentrated solution, by the action of a moderately strong current. By using dilute solutions and a weak current, the silver has been thrown down in a compact state, adhering firmly to the electrode and capable of being readily weighed. This result was only obtained in presence of free acid. From neutral solutions even a feeble current precipitated the silver in a flocculent state. These experiments were conducted with the same apparatus described in their memoir on the determination of nickel and cobalt. The following proportions appear suitable for obtaining the deposit of metallic silver in a compact form: In 200 cc. of liquid submitted to electrolysis there should be from 0.03 to 0.04 gram metallic silver and 3 to 6 grams free nitric acid, the electrodes being at a distance from each other of 1 cm., and the strength of the current such as to evolve 100 to 150 cc. detonating gas per hour.

The Roberts Locomotive.—Col. E. A. L. Roberts, of Titusville, has made a contract with the Baldwin Locomotive Works to build a passenger engine which he expects will be able to run 80 miles an hour, and maintain this rate of speed for 100 miles without stopping. The locomotive is to weigh 38 tons. The driving wheels will be 6 feet in diameter. The forward trucks and those on the tender will be made of paper, which it is said will endure more strain and wear than iron or steel. The wheels will all be of the pattern known as the broad-tread, which will enable the engine to run on roads of either 4 feet 8½ inches or 4 feet 10 inches gauge. The most important feature of the locomotive will be the introduction of the Roberts patent cylinder and piston, the exhaust parts being in a continuous circle around the cylinder. The tender will be so constructed as to carry a foot of water under the coal, as well as the usual amount on the sides. There will be a water chamber on the locomotive so arranged that compressed air from the air pump can be admitted in the top of the chamber upon the water, by which means a stream may be forced upon any hot bearing connected with the engine or tender. This is expected to overcome the trouble of hot boxes. The nozzles through which the steam is to pass and create a draft will be 8 inches in diameter, and the boiler will be the largest that can be put upon the standard gauge trucks. Col. Roberts, the inventor, says that he built a similar locomotive a few years ago which drew the fast mail train over a portion of the Lake Shore Railway, but it was not a success, owing to its poor construction. The improvements it suggested will be taken advantage of in building the new engine.

At a competition trial of hydraulic rams in Algeria, conducted by order of the government, which offered a gold medal and 150 francs for the best machine entered, the American hydraulic ram, manufactured by W. & B. Douglas, of Middletown, Conn., was declared by the judges to be the best and received the medal. The competition was very general.

The Boston *Journal of Commerce* computes, from somewhat imperfect data, that the engine built by Corliss for the Boston Committee of Improved Sewerage, showed a duty of 128,398,309 foot pounds with 100 pounds of coal.

In order to give the electric light a proper test before adopting it for general use with lighthouses, an appropriation of $50,000 will be recommended by the Lighthouse Board to place one of the new lights in the Navesink Lighthouse, situated on the Highlands.

Some Queer Pumps.

From various sources we have made a collection of strange and unusual forms of pumps, some particulars concerning which will constitute an interesting chapter in the current history of hydraulics.

Fig. 2 shows a sort of gigantic "old oaken bucket" arrangement. It consists of a brick curb around the mouth of the well, a cast-iron bed-plate resting upon this, covers for the well, and lastly a raised cast and wrought-iron frame, on which gearing for hoisting the bucket is carried. Judging from "internal evidence" it would appear that the bucket is about 3 feet high and 18 or 20 inches in diameter. It would therefore hold nearly or quite 45 gallons. The barrel is apparently balanced by a weight upon a rope passing over the grooved wheel at the top of the machine. At the side a cast-iron tank is placed to hold the water, and attached to it is some sort of an arrangement intended to automatically tip the bucket over and empty it. The power is, according to the popular expression, greatly multiplied, being about four to one. Altogether the arrangement is a novel one, though to what purpose it is put we are at a loss to imagine, as we should think a good pump would be much cheaper and would work with greater economy of power. There is this to be said for such an apparatus, when the cog wheels are strongly made, that in countries where repairs are difficult to get such an apparatus is valuable because of its simplicity and strength, and any wear that may take place does not make any perceptible alteration in the working of the machine.

In Figs. 1, 3 and 5 we have some forms of a pump of French origin. Fig. 1 represents the pump mounted on a portable frame apparently set up for show. The whole apparatus is exceedingly compact in form, and the valves seem to be concealed in the case, which contains what we suppose must be the semi-rotating piston. Fig. 3 shows the pump attached to a plank for use in a house or against a wall. Fig. 5 shows the arrangement when the pump is placed in a deep well. The latter one illustrates the fondness which European engineers show for crank arrangements when applying man-power. The simplest form for driving a pump of this kind is, of course, a lever after the fire-engine fashion. The unequal wear of all pumps of this kind is one of the insurmountable objections to them. Do what we will, the piston fixed at the center, or at one side, wears faster there than at the outer edge, and unfortunately this kind of wear cannot be taken up by any known form of packing. Such pumps, therefore, work well for a time and then begin to fall off in their performances. Repacking only helps them for a short time and then they are as bad as ever, and at last they have to be thrown away. One or two of our American pump-makers have pumps of this pattern, which are very useful for raising liquids to a small hight, as in discharging barrels or pumping water through short lifts. In such cases, the leakage under the small pressures needed bears so small a ratio to the quantity raised as to be immaterial.

Fig. 4 shows the strangest pump of all, and yet the one which in all probability is the most effective. This form of pump was discovered by Thomas Ewbank, probably 40 or 50 years ago. We say discovered, for the apparatus is so simple as to hardly be worth the name of invention, the principle only being essential. It would seem that a Mr. De Coligny is introducing the apparatus as an agricultural pump in France. The following is the substance of an article in regard to the pump which appeared in a French agricultural journal. "In a recent meeting of one of the agricultural societies, in the farm region of Laval, the jury took into consideration the question of farm pumps, and very unanimously agreed upon the advantages of ball valve pumps on account of the ease with which they passed all sorts of solid matters." It appears, however, that while they were discussing the advantages of ball valves Mr. Chemin, engineer of bridges and highways, fairly took them by surprise when he showed them the queer-looking pump which we illustrate, which has no valves at all. "Mr. Chemin offered to build a pump and set it at work for the jury, and his offer being accepted he set one of these pumps at work with little delay in the sluice of the Mayenne. The ease and speed with which the apparatus was erected and set at work greatly increased the interest felt by the jury in the pump. They were greatly surprised to find that the pump was constructed simply of an open funnel and an old, disused pipe, and that no valves were used. A plain sheet metal pipe of iron (though it could be of sheet zinc), about 4 inches in diameter and 4 feet 11 inches long, formed the body of the pump. Below, the funnel-shaped portion widened until at the bottom it was a fraction over 7 inches, with a total length of 9 feet 10 inches. This tube forms at once both body and working parts of this unique pump. The top of the tube is surmounted by a hemispherical cap to arrest the upward flow of water. The cap is attached to the tube by straps, and the whole apparatus is fastened at the end of a horizontal lever, which is pivoted in the manner shown in the sketch. The object of this is to give the pump body an upward and downward motion in a vertical direction. By giving the pump body a regular up-and-down motion by means of the lever timed according to the size and flare of the funnel-shaped portion, the water rises after a few seconds, the time depending somewhat upon the speed of the strokes, and flows from the top. This phenomenon, though valuable, escapes calculation. The committee proved that the pump was capable of raising water about 14 feet above the source of supply. At each sharp immersion of the pipe, caused by the motion of the lever, the quantity of water discharged is greater than would be expected from a solid piston working in the pipe and having an equal movement. The water thus raised strikes the cap with violence, and flows into a trough conveniently placed to receive it. The tube or body of the pump ought to enter the water from one-third to one-half its hight.

"This is the simplest form of agricultural pump that has yet been proposed, and combines in the highest degree the following advantages: Simplicity, cheapness in construction, repairs and absence of working parts, like pistons, valves, &c. There are no delicate parts, no valves nor suckers to break or wear or leak, performing ill or not at all. For farm or other uses, for raising clean or foul liquids, like sewage or water carrying vegetable matters, it has a marked field of usefulness."

Although the French gentleman seems somewhat enthusiastic in his praise, we do not think it at all too great. This pump will doubtless do all that he claims for it and more. It certainly deserves to be better known.

We may observe that its principles were investigated by Mr. Ewbank, who spoke of them at some length in his work on hydraulics. In Fig. 6, we show the same pump with some slight modifications. A curved spout is put upon the top of the pump, so as to direct the stream of water into a trough. At the bottom a straight piece of tube is slipped down over the flaring part. This is done so as to make the upward stroke of the pump easier. This is practically the form suggested by Mr. Ewbank. For all sorts of pumping where large quantities of water or semi fluid solids are to be lifted short distances, this is probably one of the most economical forms of pumping apparatus that has been devised. In saying this we, of course, take into consideration the cost of the apparatus and the ease of operation.

Fig. 1.—French Vibrating Pump on Portable Stand.

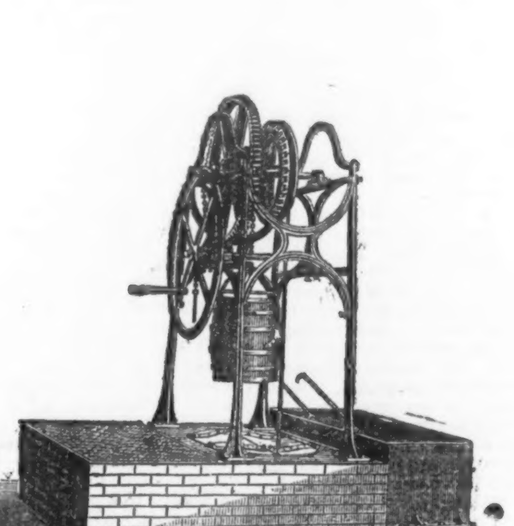

Fig. 2.—The Old Oaken Bucket in a New Form.

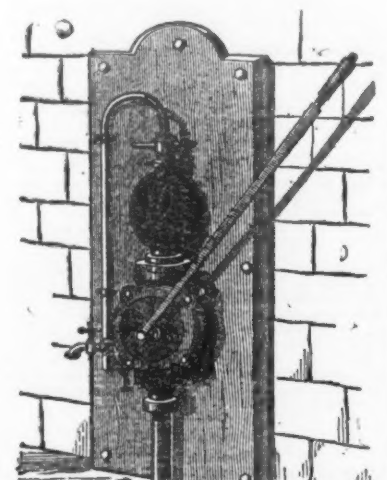

Fig. 3.—Vibrating Pump, Mounted on a Board.

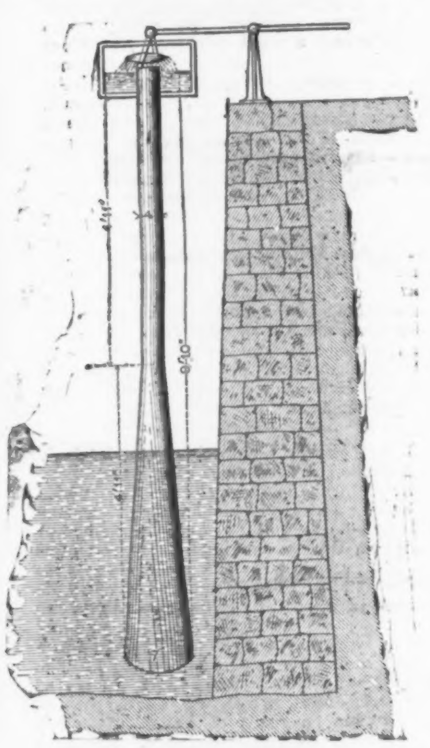

Fig. 4.—A French Jet Pump

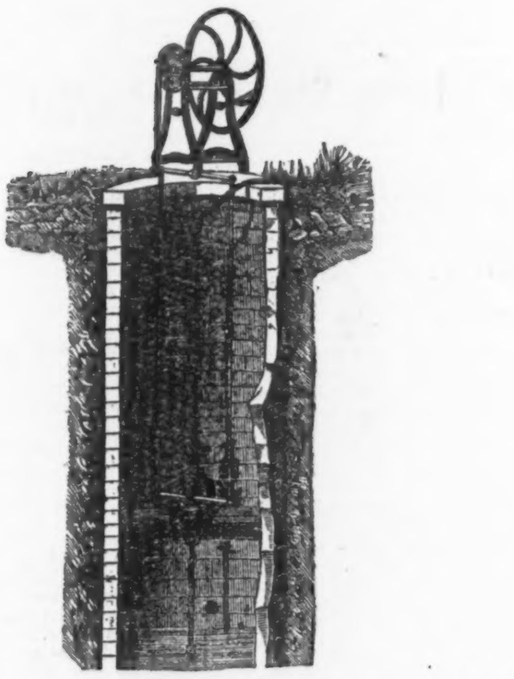

Fig. 5.—Vibrating Pump, Mounted in a Deep Well and Worked by a Crank.

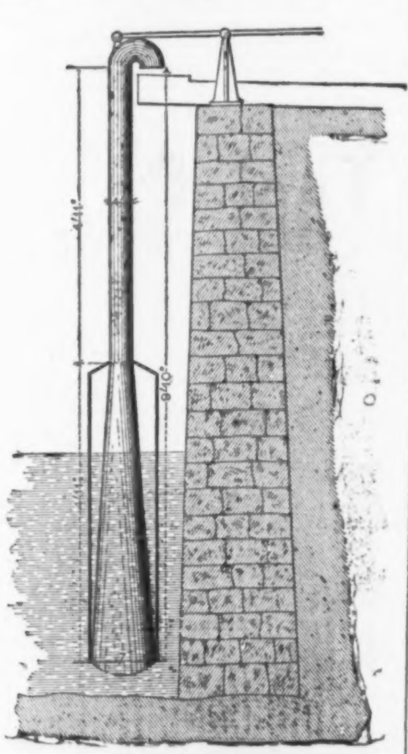

Fig. 6.—Jet Pump with Curved Spout.

SOME QUEER PUMPS BY FRENCH AND ENGLISH INVENTORS.

The engineers of the St. Gothard Tunnel are stated to be in a fair way to overcome the difficulty arising from the falling in of the roof in the part known as the "windy stretch." This stretch, which is 200 meters long and situated directly under the plain of Andermatt, passes through strata composed alternately of gypsum and aluminous and calcareous schists, which absorb moisture like a sponge and swell on exposure to the atmosphere. It has given the contractors immense trouble, and has fallen in so often that it was seriously proposed a short time ago to allow it to collapse and make a bend, so as to avoid the "windy stretch" altogether. The expedient now adopted, which has so far been successful, is the rebuilding of the supporting masonry in rings of solid granite. The rings are each 4 meters long, so that in the event of any one of them giving way the others will not thereby be affected. The building is constructed slowly and with the utmost care; no imperfect stones are allowed to be used; the masonry is perfect and the walls of extraordinary thickness—in the parts most exposed to pressure not less than 10 feet. At the beginning of June only 34 meters of the "windy stretch" required to be revaulted.

INDUSTRIAL ITEMS.

NEW JERSEY.

The Watson Fire-brick Manufactory, at Perth Amboy, established in 1836 by John R. Watson, will in future be continued under the name of the Watson Fire-brick Co., and will be managed by his sons, J. T. & U. B. Watson, who have been engaged with him for some 20 years. The quality of the brick will be carefully kept up as heretofore, and they will bear the same stamp, viz.: "Watson's No. 1, Perth Amboy, N. J."

PENNSYLVANIA.

The Pottsville Iron and Steel Company is the name of a manufactory to be located at Pottsville, with a capital of $450,000.

The new rolling mill of Messrs. Kimberly, Carnes & Co., at Greenville, built on the site of the one burned, will soon be ready for operation. It will be far superior to the old one, many improvements having been added, and will have 20 puddling furnaces and four heating furnaces.

Messrs. Moorhead, McLean & Co.'s Soho Furnace, at Pittsburgh, made during October 3514 and 271-2268 tons of gray forge pig iron. The last week in the month the product was 862 and 1274-2268 tons.

The new furnace C of the Edgar Thomson Steel Company, Limited, near Pittsburgh, was satisfactorily blown in on the 8th inst. Dimensions, 80 x 20 feet.

The large rolling mill and steel works of Henry Disston & Sons, at Tacony, near Philadelphia, are completed and being gradually put in full operation. The building has a front of 200 feet on the river and a depth of 160 feet. The concern is the most complete in its machinery and processes in the country. Messrs. Disston & Sons have also erected in the vicinity, during the season, 22 additional dwelling houses for the occupancy of the employees at the different establishments at Tacony.

The new cordage works of Edwin H. Fitler & Co., just north of the Bridesburg Arsenal, are already beginning to show their vast proportions. The cordage house, 315 by 50 feet, is nearly up to its full hight of three stories, and the rafters are being raised over a portion of it. The foundation of the storage-house, fronting on Tacony road 250 feet, running back 100 feet, is laid. Excavation for the chimney-stacks, 140 feet high, is in progress. The piling for the wharf on the river front of the property is rapidly progressing. The wharf will extend out 600 feet. The material for the other buildings is being delivered on the grounds, and work on them will be continued during the winter, or as long as the weather will permit.

DELAWARE.

The new sugar mill of the Delaware Beet Sugar Co., at Riverside, a short distance above Wilmington, commenced operations last Monday, and are working up fifty tons of green beets per day. Last year the entire product of sugar beets in Delaware amounted to about 300 tons, but this season the company expect to obtain from three to four thousand tons of better beets than last year, the cultivation having been better understood. The beets already delivered are testing from 8 to 14 per cent of saccharine matter, and the company are paying from $3.50 to $7 per ton for them. If they obtain the quantity of beets calculated upon, the product, under the new and improved process now in use in the new mill, will be about 550,000 pounds of raw sugar, 200,000 pounds of molasses, and 1700 tons of pulp, which is now selling at the factory to farmers at $1 per ton. It is stated that some of the beets were allowed to remain in the ground too late in the season, and thereby were somewhat deteriorated for producing sugar. This, with other defects in the cultivation, will, it is said, be remedied the next season.

At the Edgemoor Iron Works, on the Delaware, a few miles above this city, the men are working night and day. In addition to miscellaneous work they are fulfilling their contract for iron work on the elevated road of the Pennsylvania Railroad Company, on Filbert street. The company have also secured the contract for the iron work of the new depot to be erected here by the Philadelphia, Wilmington and Baltimore Railroad.

OHIO.

A newly-organized corporation, of which Mr. Samuel Danks, the inventor of the mechanical puddler, is general manager, is erecting a large rolling mill at Cincinnati, intended exclusively for the manufacture of plates. It will contain 10 Danks' puddling furnaces.

The Perin & Gaff Manufacturing Company, of Cincinnati, have done a very heavy business this year. A large force of operators are employed turning out tools of various kinds and shelf and builders' hardware. During this year the products of this establishment have been more than double, and it is expected that the trade of the coming spring will be more than double that of any season in the history of the company. Besides the regular line of shelf and builders' hardware, the company manufactures a number of specialties for the trade.

ILLINOIS.

An important addition to the iron manufacturing interests of Chicago has just been made in the completion of an extensive blast furnace by the Jos. H. Brown Iron and Steel Company, at their works near South Chicago, a few miles south of the city limits. The iron mill of this company was opened in 1876 for the manufacture of merchant bar iron and rails, and has a capacity of about 100 tons of bar iron per day and about 5000 kegs of nails per week. Heretofore the company has procured its pig iron from all directions, East and South, but its blast furnace enables it to take the ore from Lake Superior and the Menominee district and reduce it to pig iron at the rate of 1000 tons of pig per week. The new furnace is 18 feet bosh and 75 feet high, and is built with the Siemens-Cowper hot blast. One blowing engine, 52-inch steam cylinder, 90-inch blast cylinder, 6 foot stroke, with condenser, variable cut-off and governor has also been added. The furnace was erected by Gen. J. T. Torrence, general manager of the company, who has had great experience in iron manufacture, and says that the blowing in was one of the most successful starts he ever made. The first cast of iron, says the *Railway Age*, was 12½ tons of No. 3 foundry, the second 24 tons, cast every six hours. The company have in course of construction another blowing engine of about the same capacity, which will soon be in operation. With these additional improvements 150 more men will be employed. At present they employ about 1000 hands per week. The Joseph H. Brown Company was the pioneer of iron manufacture in the southern suburbs of Chicago, and its energy and enterprise have done much to bring other great manufacturing establishments into that region. The officers are: President, Joseph H. Brown; treasurer, F. W. Newland; general manager, Joseph T. Torrence. Chicago is taking an important position as an iron manufacturing center, having now five blast furnaces in operation and six building. The North Chicago Rolling Mill Company have two furnaces running, and are building four at South Chicago, two of which are expected to be in operation by February 1. The Union Rolling Mill Company have two in operation and are building two more. The total capacity of these 11 furnaces will be not far from 1000 tons per day.

INDIANA.

The South Bend Iron Works, at South Bend, manufacturing the Oliver chilled plows, have, in the past 18 months, increased the capacity of their works about double, and such has been the demand for their plows that they are now running far behind their orders. They report sales of plows for 1880 up to about the 1st of November 85,000, and say that they could have sold 15,000 more if they could have made them in time. They anticipate a still greater increase of sales in the coming year.

MISSOURI.

The St. Louis Refining and Smelting Works, at Cheltenham, about five miles from St. Louis, have been destroyed by fire. The loss is about $75,000; insured for $48,700. The fire was caused by the bursting of one of the smelting furnaces containing 25 tons of molten lead.

Protection Against Fire on the Steamboat Narragansett.—When the steamer Narragansett, which was sunk by the Stonington in the Sound on the night of June 11 last, was raised, there was a large hole in the side of the hull, and the upper works had been burned away. She was towed to the shipyard at Noank, the hull was repaired and the engines were rebuilt. The arrangement of the cabin and state-rooms is essentially the same as before, and a new feature of the boat is a boiler-iron fire-proof compartment which surrounds the boilers. This provision against accident by fire was recommended by the coroner's jury in the Seawanhaka case, and thus far the Narragansett is the only boat running through the Sound which is thus protected. The boilers stand upon a floor of brick, laid in cement. The boiler-plate walls about them extend up above the hurricane deck, and the entrance to the engine-room, and indeed all other entrances, can be closed promptly by iron

doors. The Stonington, the sister ship of the Narragansett, is to be similarly protected. At the time of the collision the rubber gas lamps or bags on the Narragansett were exploded and ignited by the headlight of the Stonington. The new boat will use gas stored under pressure in six steel cylinders. The kitchen, oil and paint lockers of the Narragansett are also fire-proof by reason of galvanized iron linings to their walls and ceilings. The new boilers have also been improved. The smokestacks are made a part of them up to a point above decks, so that if in any case the stacks above should go overboard, enough would remain rigidly attached to the boilers to insure a draft and the keeping up of the fires.

The Tinman's Squaring Shears.

The Metal Worker says: We want to enter a protest in behalf of tin and sheet iron workers against squaring shears as they are commonly built at the present time. In general they may be characterized as trifling, not only in design, but in the details of their construction. Part of their faults, and perhaps a very large part, arises from the fact that in buying tools the first question raised is the price, regardless of improvements or advantages of other patterns. Sheet metal workers themselves have, in fact, offered a premium for the cheapest, poorest and most flimsily constructed tools which could be made. In the common squaring shears the legs are attached to the body in such a way that after a very little usage the whole thing becomes rickety, as though it were made of basket-work instead of iron. In some patterns the only connections between the frame and the legs are a couple of set screws. At the bottom the only bracing which the legs have is the rod upon which the treadle is hung. This adds nothing whatever to their steadiness. It is little wonder, then, that after a comparatively small amount of usage they become ramshackle affairs. At the sides are usually two T-shaped castings in which the upper knife rises and falls. These are held to the frame by a couple of set screws. This construction would be well enough if a sufficient quantity of metal were used. For the purpose of moving the upper knife back against the lower one or keeping it in that position, two long set-screws are used, which stick out in the front of the machine, sometimes as much as 2 inches from the bed plate, and make admirable projections for scraping knuckles, catching clothes and work. Now, as these T-pieces have to be moved only a fraction of an inch, we cannot see any use of putting in a screw 2 inches long to effect this adjustment. The amount of movement in this direction needed by the principal blade is only enough to compensate for the grinding. So this 2-inch screw with its square head is a double waste of material, since it is inconvenient as well as useless.

Usually the connection between the T or side pieces and the bed plate is none of the best. The set-screws, by which they are held, work in slotted holes, and the strains are resisted by friction only; as a consequence of this the connection is anything but a secure one. The guides in which the principal knife rises and falls in some machines are practically without any compensation for wear. This is bad, but it is rendered worse by the fact that the metal is not thick enough to withstand the strains brought upon it without springing, and the surfaces are so small that a good deal of wear takes place necessarily. We do not suppose that with slots of proper size and bearing surfaces large enough to do their work, appreciable wear would take place in 20 years, but by reason of bad treatment or a variety of circumstances, it is necessary to be provided with an arrangement for taking up the wear. It has been found in machine tools of the very best grade that this is necessary, even in bearings which, theoretically, ought never to show any signs of wear. Thus, in drills, where a plain rod is made to fit easily in a plain cylindrical hole, after a time, from hardening of the oil or the accumulation of dust, wearing or cutting begins and continues rapidly unless some means is provided for opening the bearing, cleaning it and putting it in good condition. After wear once takes place, adjustment is, of course, necessary.

The knife bar itself, in most of the machines which we have examined, is altogether too small and too light to hold the knives straight. The connection between the bed and the gauges—or, rather, the slotted irons which hold the gauges—is usually of a flimsy character, and a single set screw is employed, together with dovetails, to make the thing secure. As the surfaces are undressed, the screws do not have a sufficient hold upon the metal to make the joint a firm one. The same is true of the set-screws, holding the gauges themselves in the slots. They slip and slide about, unless the greatest care is taken. The rule is that they don't stay. It is always necessary to hunt up a monkey wrench to set them, which, we think, is unnecessary. They should be made so that they could be set by hand in some way.

In the back gauges it is the exception, rather than the rule, to find the screws on different sides interchangeable, yet they are not marked to show which is which; in fact, the work throughout is so cheap that the parts cannot or have not been made really interchangeable. The excuse is that the low price at which the machines have to be sold makes it necessary to economize in every possible way in their manufacture.

The back gauges are radically wrong in their shape. Something more is needed than the simple stop. The outer end of a piece of tin when shoved under the knife, if the metal is light or if the gauge is set well back, drops down so that the gauge is of no use. Sometimes, to avoid this trouble, workmen turn the gauges around with the back side facing the front, and rest the outer edge of the tin upon the ledge thus obtained. Other times a man or boy is sent around behind the machine to hold the metal up while the one in front cuts. Now, there is no reason why there should not be a projection upon the under side of the gauge upon which the sheet of metal to be cut can rest.

The sizes of the squaring shears are from what they should be. There are only two regularly in the market, the 20 inch and the 30 inch, yet, according to the sizes of sheets and the work that the sheet metal worker has to do, there are wanted not only 20-inch or 30-inch, but also 4 feet, 6 feet and 8 feet shears. The last three sizes have, so far as we know, been made to order only, and some works have had considerable difficulty in getting a good article. We see no difficulty in the way of designing, and building for the general market, squaring shears that would cut a sheet of metal of the ordinary gauges 8 feet or more wide.

There is a great deal of work considered difficult and annoying by the country tinsmith, and of which complaints are made, which is directly traceable to the fact that good squaring shears which will work with anything like reasonable accuracy are difficult to obtain. What is needed are shears that are both strong, accurate, convenient and capable of being easily adjusted. Shears of this kind could not be made like snips and swedges, to be sold by the dozen; they must be built like presses, punches and similar heavy machines. The quantity of metal will have to be greatly increased, and more work bestowed upon the shears. The quality of the work must also be improved. When shears are built in this way they will be found to be not only more accurate, but more durable.

Bulldozing a Shareholder in England.

A novel performance which took place at the half-yearly meeting of the Grand Trunk Railway, held in London on October 28, is related by the *Railway World*. After an elaborate address descriptive of the condition and prospects of the company had been made by the president, Sir Henry W. Tyler, which concluded with a motion that the accounts and reports be received and adopted, and after this motion was seconded by the vice-president, a discontented shareholder, Mr. Hales, rose to address the meeting. The audience was indisposed to listen to his criticisms, and by a loud clamor and cries of "chair" and "sit down," gave very pointed evidence of their desire to dispense with his eloquence. Mr. Hales, however, insisted upon his right to address the meeting, which, in turn, persisted in asserting its indisposition to hear him by a continued uproar and by shouts of "turn him out." At this stage a motion was made and seconded that Mr. Hales be not heard. The president put this motion to the meeting, and it was carried unanimously. Despite this emphatic decision, Mr. Hales insisted on continuing his speech, whereupon he was forcibly ejected from the room by an athletic stockholder, amid the cheers of the audience. The president then expressed his conviction that "when a gentleman finds that it is not the wish of the meeting to hear him, he ought to sit down," and the discussion of the report proceeded without further interruption. The method of suppressing Mr. Hales was evidently regarded as exceptional, and as perhaps of doubtful legal validity; but the shareholders placed such a high value upon the service rendered that before adjourning they unanimously agreed to a resolution which approved the act of the gentleman who ejected the unpopular orator, and directed the solicitor of the company to represent him, at the company's cost, in any proceedings that might be instituted on account of the summary ejectment.

Petroleum Exports.

The following figures give the condensed history of the export trade in petroleum, the proportion of crude to refined having been about equal in the earlier years, but recently only a small share being crude. A small amount was exported in 1862, but no record was kept of it, and for 1862-63 the return is not complete, quite as much more having gone out as "unenumerated," a favorite evasion with the incompetent statisticians of that time:

QUANTITIES AND VALUES OF PETROLEUM EXPORTED.

Fiscal years.	Gallons.	Value.
1862-63	155,874	$27,839
1863-64	23,210,369	10,782,689
1864-65	25,479,569	16,548,969
1865-66	50,241,297	24,373,933
1866-67	70,255,481	24,407,683
1867-68	78,769,314	21,588,949
1868-69	100,502,152	31,074,416
1869-70	113,728,423	32,669,960
1870-71	149,677 585	36,880,040
1871-72	144,713,397	34,016,666
1872-73	187,054,113	41,971,190
1873-74	245,978,685	41,103,516
1874-75	219,202,450	29,891,465
1875-76	241,078,748	32,722,580
1876-77	306,022,294	61,472,082
1877-78	334,871,013	46,258,887
1878-79	375,002,972	40,094,523
1879-80	*435,785,796	*37,109,258

In this short but most remarkable commercial history the country has received a total of $562,992,645 for its surplus of a mineral article unknown up to 1860 as an article of commerce. The quantity exported was 3,061,710,622 gallons, or 76,542,765 barrels, a quantity almost inconceivable for its mere magnitude. Surely this result justifies the predictions and estimates of those who claimed and hoped that a great commercial product would be developed, and who insisted that this was a vast primary deposit analogous to coal itself, and as little likely to be at once exhausted as coal. On the contrary, many scientists classified it as an organic product, the expressed oil of the unlucky mollusks of the carboniferous era, and therefore likely to be exhausted from the sand-rock when the gas should all escape. Absurd as many theories were we can afford to laugh at them now that it has profited us by the vast sum of $1,000,000,000, one-half or more—namely, $563,000,000—having already been paid us in cash by foreign nations.

Two somewhat similar electric lamps are attracting considerable attention at the present time. Both have been repeatedly referred to in the columns of *The Iron Age*, but neither has until now reached that stage when it has passed successfully out of the domain of a laboratory experiment. The Sawyer and the Maxim lamps are both constructed on the incandescent principle, and possess the great advantage common to all such lights of great steadiness and absence of the glare that is so inconvenient in electric air lamps. The Maxim light, which is being exhibited in this city, resembles somewhat that of Edison. The carbon filament, however, instead of being a simple loop, has a double reversed curve like a capital M, with the upper and middle corners rounded. The sealing of the vacuum, or partial vacuum, is claimed to be accomplished in some other way than by fusing the glass, which is Edison's patent. On the top of the globes are small pieces of red matter, like sealing wax, and this is said to be the sealing matter. In one of his patents Mr. Maxim claims "a hydro-carbon vacuum or highly rarefied hydro-carbon vapor" in a sealed globe for electric lighting; the combination of the carbon filament with the hydro-carbon vacuum; the process of producing this vacuum is a globe, "by displacing the air contained in it with liquid hydro-carbon, expelling a portion of such hydro-carbon by heat and exhausting the remainder; appliances for sealing the globe with wax or pitch." In a later one it reads "the process of removing atmospheric oxygen from the globe of an electric lamp, consisting of first exhausting or otherwise removing the greater part of the air contained in such globe, and then admitting thereto and exhausting therefrom a hydro-carbon vapor or gas."

* One month estimated at one-eleventh of 11 months.

Iron Making in California.—Our San Francisco contemporaries state that several wealthy capitalists of San Francisco have formed a company and erected large works, at an expense of $100,000, which will give employment to 100 men, for smelting iron ores found near Auburn, Placer County. The deposits are said to be very large, and it is thought that the ores, which are hematites and magnetites, much like those of the Lake Superior region, will be easily worked. The enterprise, which is undertaken with great confidence, will soon be past the period of experiment. Another company of San Francisco gentlemen has been formed to erect smelting works near other iron deposits which have been for some time known to exist in Sierra County. Still another deposit of iron, and probably much more extensive than either of the others, has recently been discovered near the McCloud River, in Shasta County. The ores, which are also hematites and magnetites, are found in connection with limestone, which crops out along a hillside for a distance of 1000 feet. The locality will soon be examined by the State Mining Bureau, and an opinion given regarding the extent of the deposit, the character of the ores, and the difficulties to be overcome in working them. If everything is found favorable, there is little doubt that a third company will be formed and furnaces in operation, before many months, in Shasta county. The geological formation of the McCloud is carboniferous, and it is to be hoped that coal will be discovered in the vicinity, which would supply one of the most important agents used in smelting.

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The New Haven Copper Co., 215 Pearl, N. Y. 2
Corn Huskers.
Chambers, Boring & Quinlan, Decatur, Ill. 30
Corn Sheller.
Godard Curtis, Alliance, O. ....
Corrugated Iron.
Moseley Iron Bridge and Roof Co., 5 Dey, N. Y. 6
Cotter and Cotter Keys.
Browning, Slaum & Co., 85 Chambers, N. Y. 25
Countersinks.
Barber D. F., 1321 Washington, Boston 30
Cupolas.
Griffith & Wyre Mfg. Co., 21 Cortlandt, N. Y. 30
Cutlery, *Importers of.*
Boker Hermann & Co., 101 Duane, N. Y. ....28&34
Clauworthy F. & W. & R., 85 Chambers, N. Y. ....
Friedmann & Lautorjung, 91 Chambers, N. Y. 10
Cutlery, *Manufacturers of.*
Burkinshaw Aaron, Pepperell, Mass. ....
Conway T. C., 90 Chambers, N. Y. ....
Greenfield Tool Co., Greenfield, Mass. 10
Goodell Co., Antrim, N. H. ....
John Russell Cutlery Co., 90 Chambers, N. Y. ....
Meriden Cutlery Co., 49 Chambers, N. Y. ....
The Wm. Rogers Mfg. Co., Hartford, Ct. 11
The Lamson & Goodnow Mfg. Co., 88 Chambers, N. Y. ....
Differential Pulley Blocks.
Yale Lock Mfg. Co., 53 Chambers, N. Y. 3
Dinner Pail and Lanterns.
Lewis Jos., Portchester, N. Y. ....
Discount Tables.
Jennings S. H., Deep River, Conn. ....
Door and Gate Springs.
Van Wagoner & Williams, 82 Beekman, N. Y. 36
Door Bolts.
Ives Hobart B., New Haven, Ct. 23
Drilling Machines, *Makers of.*
Fisher A. E. & Co., Springfield, O. ....
Sellers Wm. & Co., Phila. and 79 Liberty st., N. Y. 37
Thorne, De Haven & Co., Philadelphia 33
Wiley & Russell Mfg. Co., Greenfield, Mass. 37
Drop Forgings.
Merrill C. & Sons, 556 Grand, N. Y. ....
Drop Hammers.
The Stiles & Parker Press Co., Middletown, Ct. 38
Drop Presses, *Makers of.*
Beecher & Peck, New Haven, Ct. ....
Edge Tools, *Makers of.*
Buck Bros., Millbury, Mass. 21
Elevators, *Makers of.*
Dauchen H. & Chambers, N. Y. ....
Union Bros. Mfg. Co., Chicago, Ill. ....
Stokes & Parrish, Philadelphia ....
Elevator Buckets.
Rowland W. F., Brooklyn, N. Y. 8
Emery and Emery Wheels.
Ashland Emery Co., Perth Amboy, N. J. ....
Irwin A. & Co., 14 Murray, N. Y. 30
Lehigh Valley Emery Wheel Co., Weissport, Pa. 38
Vitrified Wheel Co., Westfield, Mass. 30

Engines, Gas.
Schleicher, Schumm & Co., Philadelphia 35
Engines (Locomotive).
Baldwin Locomotive Works, Philadelphia, Pa. 6
Engines, Steam, *Makers of.*
Davis A. J. & Co., Newark, N. J. 37
Southwark Foundry and Machine Co., Phila., Pa. ..37
The Norwalk Iron Works Co., S. Norwalk, Conn. ..35
Wetherill Robt. & Co., Chester, Pa. 37
Faucets, Brass, *Makers of.*
McNab & Harlin Mfg. Co., 56 John, N. Y. 35
Fences, Self-Measuring, *Makers of.*
Enterprise Mfg. Co., of Pa., Phila. and N. Y. 37
Lane Bros., Millbrook, N. Y. 33
Fencing, &c.
Cleveland Wrought Iron Fence Wks., Cleveland, O. 7
Files, *Importers of.*
Carr J. & Riley, 30 Gold, N. Y. 30
Files, *Manufacturers of.*
Auburn File Works, 89 Chambers, N. Y. 8
Barnett G. & H., 41 and 43 Richmond, Phila. 8
Clark & Draper, Sing Sing, N. Y. 8
Disston Henry & Sons, Phila. 32
Eberhart James M., Scranton, Pa. 38
Heller & Bros., Newark, N. J. 8
Hiscox File Mfg. Co., West Chelmsford, Mass. 8
Johnson & Bro., 1 Commercial, Newark, N. J. 8
McCaffrey & Bro., 1722 and 1724 N. 4th, Phila. 8
Nicholson File Co., Providence, R. I. 8
Paul Chas. H., Williamsburgh, N. Y. 8
Spencer J. R. & Son, Sheffield, England 10
Union File Works, Baltimore, Md. 6
Filters.
Crocker Filter Co., Boston, Mass. 12
Jewett John C. & Sons, Buffalo, N. Y. 27
Fire Arms.
Conway T. C., 90 Chambers, N. Y. ....
Hartley & Graham, 17 Maiden Lane, N. Y. 12
Lovell John P. & Sons, Boston, Mass. 13
Fire Brick, *Makers of.*
Borgner & O'Brien, Philadelphia, Pa. 32
Brooklyn Clay Retort and Fire Brick Works, Van Dyke St., Brooklyn, N. Y. 32
Gardner Brothers, Pittsburgh, Pa. 32
Hall & Sons, Buffalo, N. Y. 32
Justice Phillip S., Philadelphia 32
Kreischer B. & Sons, foot of E. Houston St. 32
Maurer Henry, 418 East 23d, N. Y. 32
Newton & Co., Albany, N. Y. 32
Ostrander James & Son, Troy, N. Y. 32
Perth Amboy Terra Cotta Co., Perth Amboy, N. J. 32
Valentine M. D. & Bro., Woodbridge, N. J. 32
Watson John R., Perth Amboy, N. J. 32
Flint and Emery Paper and Cloth.
Baeder, Adamson & Co., 730 Market, Phila. ....
Forges, Portable, &c.
Buffalo Forge Co., Buffalo, N. Y. 38
Cooke William, 6 Cortlandt, N. Y.
10, 12, 16, 22, 29, 30, 32, 34, 36 & 37
Empire Portable Forge Co., Cohoes, N. Y. 37
Holt Mfg. Co., Cleveland, O. 35
Keystone Portable Forge Co., 218 Carter, Phil. 37
Forgings, Iron and Steel.
Ross Wm. & Bros., West Philadelphia, Pa. 6
Foundry Facings.
Obermayer S. & Co., Cincinnati, O. 13
Paxson J. W. & Co., 513 Beech, Phila. 5
Whitehead Bros., 537 W. 15th, N. Y. 3
Fry Pans.
N. Y. Stamping Co., 111 Avenue A, N. Y. 27
Furnaces, *Makers of.*
Richmond & Potts, 119 S. 4th, Phila., Pa. 33
Furnace Hoists.
Stokes & Parrish, Philada., Pa. 36
Furnace Shields.
McDonald H., Pittsburgh, Pa. 37
Furniture Springs.
Carr & Moen, 234 W. 29th, N. Y. 3
Galvanized Iron.
Hoopes & Merry, 447 W. 15th st., N. Y. 6
Lefferts Marshall, 90 Beekman, N. Y. 6
Garden Tools.
Dunlap C. W. & Co., 45 Chambers, N. Y. 33
Glue.
Fox & Co., Durhamville, N. Y. ....
Grate Bars.
Creswell David S., Philadelphia, Pa. 34
Grindstones.
Lombard & Co., Boston, Mass. ....
Wood H. E. & Co., 35 West, N. Y. ....
Wood Walter R., 283 and 285 Front, N. Y. 30
Gunpowder, *Makers of.*
Ettredge B. N., N. Y. 32
Kneeland F. L. (Dupont) 70 Wall, N. Y. 36
Laflin & Rand Powder Co., 20 Murray, N. Y. 38
Handles, Spokes, &c.
Hundley & Banks, 79 Reade, N. Y. 31
Hangers, Barn Door.
Eldege Slide Door Hanger Co., Romeo, Mich. ....
S. H. & E. Y. Moore, Chicago, Ill. 27
Hardware Commission Merchants.
Fernald & Sise, 100 Chambers, N. Y. 22
Graham & Haines, 113 Chambers, N. Y. 13
[illegible], Commerce, Phila. ....
Hynes David & Co., 93 Church, N. Y. 21
Hardware Dealers.
Lloyd, Supplee & Walton, 625 Market, Phila. 21
Shepard Sidney & Co., Buffalo, N. Y. 21
Hardware Importers.
Boker Hermann & Co., 101 Duane, N. Y. ....28&34
Wolff, Kahn & Co., 146 and 110 Duane, N. Y. 10
Hardware Manufacturers.
Coulter, Flagler & Co., 87 Chambers, N. Y. 9
Cowles Hardware Co., Unionville, Conn. 23
Enterprise Mfg. Co., Phila. 37
Globe Mfg. Co., Middletown, Conn. 8
Lloyd, Supplee & Walton, 625 Market St., Phila., Pa. ..21
Millers Falls Co., 74 Chambers, N. Y. 21
Perin & Gaff Mfg. Co., Cincinnati, O. 5
Shannon J. B. & Sons, Philadelphia, Pa. 33
Shepard Hardware Co., Buffalo, N. Y. 5
Stanley Works, New Britain, Conn. 8
Tiebout W. & J., 31 Chambers, N. Y. ....
Trenton Lock & Hardware Co., Trenton, N. J. ....
Union Mfg. Co., 96 Chambers, N. Y. 7
Van Wagoner & Williams, 82 Beekman, N. Y. 36
Hardware Specialties.
Cleveland Wrought Iron Fence Works, Cleveland, O. 7
Comly James, Philadelphia, Pa. 23
Davis Wm. L., Chelsea, Mass. 32
Gleason E. P. & Co., Cincinnati, Ohio ....
Philadelphia Novelty Mfg. Co., Philadelphia, Pa. ..32
Security Blind Fast Co., Providence, R. I. 32
Shepard Sidney & Co., Buffalo, N. Y. ....
Spencer & Underhill, 94 Chambers, N. Y. 5
Sprague Novelty Works, Rochester, N. Y. 5
Harness Snaps.
Covert Mfg. Co., West Troy, N. Y. 2
Harrows.
Kimberlin R. P. & Co., Indianapolis, Ind. 24
Hay Knives.
Holt Hiram & Co., East Wilton, Me. ....
Hektograph.
Hektograph Co., 22 Church, N. Y. ....
Hinges.
Cowles Hdw. Co., Unionville, Conn. 33
Scovill Mfg. Co., 419 Broome, N. Y. 2
Stanley Works, New Britain, Conn. 8
Hog Ringers.
Chambers, Bering & Quinlan, Decatur, Ill. 28
Hoisting Engines, *Makers of.*
Crane Bros. Mfg. Co., Chicago, Ill. 36
The Norwalk Iron Works Co., S. Norwalk, Conn. ..35
Hoisting Machines.
Box Alfred & Co., 322 Green, Phila. 37
Cincinnati Chain Hoist Co., Cincinnati, O. 36
Harrington Edwin & Son, Philadelphia, Pa. 37
Sellers Wm. & Co., Phila. and 79 Liberty st., N. Y. 37
Stokes & Parrish, Phila. 36
Hooks (Cotton & Bale.)
New York Handle & Mallet Works, 456 E. Houston ..13
Horse Clippers.
Boker Hermann & Co., 101 & 102 Duane, N. Y. 28&34
Shannon J. J., Philadelphia, Pa. 8
Horse Nails, *Makers of.*
Ausable Horse Nail Co., 5 Warren, N. Y. 5
Bridgewater Iron Co., Bridgewater, Mass. 25
HP Nail Co., Cleveland, O. 28
National Horse Nail Co., Vergennes, Vt. 21
Saranac Horse Nail Co., Plattsburg, N. Y. 13
Horse Shoes, *Makers of.*
Bradlee & Co., Philadelphia, Pa. 5
Burden Iron Works, Troy, N. Y. 4
Bussing A., 4 Warren, N. Y. 5
Rhode Island Horse Shoe Co., Providence, R. I. 5
Schoenberger & Co., Pittsburgh, Pa. 4
Hot Blast Stoves.
Whitwell & Gordon, Pittsburgh, Pa. 34
Housefurnishing Goods.
Enterprise Mfg. Co., Geneva, O. ....
Hydrants, &c.
McLean John, 298 Monroe, N. Y. 27
Mohawk & Hudson Mfg. Co., Waterford, N. Y. 25
Hydraulic Jacks.
Dudgeon Richard, 24 Columbia, N. Y. 9
Ice Cream Freezers.
White Mountain Freezer Co., Laconia, N. H. 8
Insurance, Boiler.
Hartford Steam Boiler Inspection & Insurance Co. ..37
Iron. *(Manufacturers' Agents.)*
[illegible], Philadelphia 5
Hoffman J. W. & Co., 208 S. 4th, Philad. 5
Lewis Henry & Co., Philadelphia, Pa. 5
Lundell Chas. G. (Swedish), Boston, Mass. 4
Iron, *Manufacturers of.*
Albany & Rensselaer Iron & Steel Co., Troy, N. Y. ..29
Allentown Rolling Mill Co., Allentown, Pa. 5
Britton Iron and Steel Co., Cleveland, Ohio 6
Burden Iron Works, Troy, N. Y. 4
Coleman Rolling Mill Co., Louisville, Ky. ....
Kirkpatrick & Co., Pittsburgh, Pa. ....
Kloman Andrew, Pittsburgh, Pa. ....
Lang W. Talley, Beekman, N. Y. ....
Logan Iron & Steel Co., Philadelphia, Pa. 4
North Chicago Rolling Mill Co., Chicago, Ill. ....
Phoenix Iron Co., 410 Walnut, Philadelphia 5
Portsmouth Iron and Steel Co., Portsmouth, Ohio. 6
Roane Iron Co., Chattanooga, Tenn. ....
Rome Merchant Iron Mills, Rome, N. Y. 6
Rowland Wm. & Harvey, Philadelphia 38
Shoenberger & Co., Pittsburgh, Pa. 6
Taylor & Boggis, Cleveland, O. ....
The Passaic Rolling Mill Co., Paterson, N. J. ....
Ulster Iron Works, 93 Wall, N. Y. ....
Williams, Long & McDowell, Pittsburgh, Pa. ....
Wood Alan & Co., 519 Arch, Philadelphia ....
Iron Brokers.
Boynton Geo. A., 70 Wall, N. Y. ....
Ewing Edward J., Philadelphia, Pa. ....
Gelaudet P. W., 3 & 5 Wall, N. Y. ....
Hatry A. G., Pittsburgh, Pa. ....

Iron, Charcoal. *Warm or Cold Blast.*
Logan Iron & Steel Co., Philadelphia 4
Lundell Chas. G. (Swedish), Boston, Mass. 4
Quincy John W., 98 William, N. Y. 4
Iron Commission Merchants.
Bailey J. F. & Co., 52 Wall, N. Y. 5
Heberton & Co., Philadelphia 5
Lundell Chas. G., Boston, Mass. 4
Mohr J. J., 430 Walnut, Philadelphia 5
Richardson J. O., 232 Dock, Philadelphia 5
Wister L. & R., 323 Walnut, Phila. 5
Iron Dealers.
Abeel Brothers, 190 South, N. Y. 4
Adams Hugh W., 56 Pine, N. Y. 4
Bonnell, Botsford & Co., Youngstown, O. 6
Borden & Lovell, 70 and 71 West, N. Y. 4
Carmichael & Emmens, 120 and 122 Cedar, N. Y. 4
Cooney Daniel F., 88 Washington, N. Y. 4
Egleston Bros & Co., 160 South, N. Y. 4
Harrison & Gilloon, 558 to 561 Water, N. Y. 4
Hoffman J. W. & Co., 208 S. Fourth, Philadelphia ..5
Judson B. F., 457 and 459 Water, N. Y. 4
Kane C., Pittsburgh, Pa. 4
Lissberger S. A., 529 E. 10th, N. Y. 4
Lundberg Gustaf, 28 Kilby, Boston, Mass. 4
Lundell Chas. G. (Swedish), Boston, Mass. 4
Matheson & Grant, 32 Walbrook, London, Eng. 16
Middleton W. S., 52 John, N. Y. 4
Naylor & Co., 99 John, N. Y. 30
Ogden & Wallace, 85, 87, 89 and 91 Elm, N. Y. 4
Pierson & Co., 24 Broadway, N. Y. 4
Pullman J. Wesley, Philadelphia, Pa. 5
Quincy John W., 98 William, N. Y. 4
Richards D. W. & Co., 92 Mangin, N. Y. 4
Swan John E. & Bros., Glasgow & Middlesbrough. 6
Wallace Wm. H. & Co., Albany and Washington streets, N. Y. 4
Warner A. B. & Son, 28 and 29 West, N. Y. 4
Williamson James & Co., 60 Wall, N. Y. 4
Wilson, R. A. & Co., Pittsburgh, Pa. 4
Whitney A. R., 48 Hudson, N. Y. 4
Iron, Pig, *Importers of.*
Clark E. W. & Co., Philadelphia, Pa. 5
Lee James & Co., 72 Pine, N. R. 4
Lundell Chas. G. (Swedish), Boston, Mass. 4
Wheeler E. S. & Co., 54 Cliff, N. Y. 6
Williamson James & Co., 60 Wall, N. Y. 4
Iron, Sheet, *Manufacturers of.*
Wood W. D. & Co., Pittsburgh, Pa. 4
Iron Stable Fixtures.
Howard & Morse, 45 Fulton, N. Y. 2
Lanterns, *Manufacturers of.*
Dietz R. E., 54 and 56 Fulton, N. Y. 38
Howard & Morse, 45 Fulton, N. Y. 2
Miller Edw'd & Co., 35 Warren, N. Y. 25
Lathe Dogs.
Coles H. H. & Co., Philadelphia, Pa. 37
Levels.
Disston Henry & Sons, Philadelphia 32
Jennings C. E., 96 Chambers, N. Y. 37
Locks and Knobs.—*Manufacturers of.*
Bohannan Wilson, Broadway and Kossuth, Brooklyn, E. D. 29
Branford Lock Works, Branford, Conn. 30
Coulter, Flagler & Co., 87 Chambers, N. Y. 9
D. K. Miller Lock Co., Philadelphia, Pa. ....
Dorrie & McCarty, 97 Chambers, N. Y. 31
Hillebrand & Wolf, 110 S. 8th, Philadelphia 28
Romer & Co., Newark, N. J. 35
Smith & Egge Mfg. Co., Bridgeport, Conn. 22
Yale Lock Mfg. Co., 53 Chambers, N. Y. 3
Lubricator.
American Lubricator Co., Detroit, Mich. 35
Machinery, *Makers of.*
Akron Iron Co., Akron, O. 29
Bliss & Williams, 167 Plymouth, Brooklyn 36
Box Alfred & Co., 322 Green, Phila. 37
Bradley & Co., Syracuse, N. Y. 21
Cooke Wm., 6 Cortland, N. Y.
10, 12, 16, 22, 29, 30, 32, 34, 36 & 37
Forsaith S. C. & Co., Manchester, N. H. 16
Garvin E. E. & Co., 139 Center, N. Y. 37
Johnson, Israel H. Jr., Philadelphia, Pa. 34
Landis Ezra F., Lancaster, Pa. 24
L. B. Flanders Machine Works, Philadelphia, Pa. ..34
Lyon E. & Co., 470 Grand, N. Y. 26
Mohawk & Hudson Mfg. Co., Waterford, N. Y. 25
Oram & Atherton, Cleveland, O. 30
Pittsburgh Mfg. Co., Pittsburgh, Pa. 36
Sellers Wm. & Co., Phila. and 79 Liberty st., N. Y. 37
Stokes & Parrish, Philada., Pa. 36
The Stiles & Parker Press Co., Middletown, Ct. 38
Wetherill Robert & Co., Chester, Pa. 37
Machinery (Barnes's Foot Power.)
Little Chas. E., 50 Fulton, N. Y. 10
Machine Screws, *Makers of.*
Fellows John, Williamsburg, N. Y. 36
Waterbury Mfg. Co., Waterbury, Conn. 2
Machinists' Tools.
Blaisdell P. & Co., Worcester, Mass. 35
Brooks A. G. & Winebrener, Philadelphia, Pa. 16
Bullard E. P., 14 Dey, N. Y. 16
Cooke Wm., 6 Cortland, N. Y.
10, 12, 16, 22, 29, 30, 32, 34, 36 & 37
Geo. Place Machinery Agency, 121 Chambers, N. Y. 16
Harrington E. & Son, 15th st. and Pennsylvania ave., Philadelphia, Pa. 37
J. Gray Machinery Depot, 37 Dey, N. Y. 16
King J. M. & Co., Waterford, N. Y. 6
Marcellus C. N. & Co., 91 Liberty, N. Y. ....
Sellers Wm. & Co., Phila. and 79 Liberty st., N. Y. 37
Stockwell Screw & Machine Co., Cleveland, Ohio ..36
Mallets.
N. Y. Handle and Mallet Works, 456 E. Houston 13
Penfield Block Works, Lockport, N. Y. 36
Measuring Tapes.
Eddy Geo. M. & Co., 353 Classon Ave., Brooklyn, N.Y. 10
Meat Cutters.
Lloyd, Supplee & Walton, Philadelphia, Pa. 21
Murray Iron Works, Burlington, Iowa 10
Metals.
Dickerson, Van Dusen & Co., 29 and 31 Cliff, N. Y. ..2
Goldsmith Moses & Son, Charleston, S. C. 6
Naylor & Co., 99 John, N. Y. 30
Northrop A. C., Waterbury, Conn. 2
Phelps, Dodge & Co., Cliff, bet. John & Fulton, N. Y. 2
Phosphor Bronze Smelting Co., Limited, 2038 Washington av., Phila. 28
Purves A. & Son, cor. South and Penn, Phila. 5
Quincy J. W., 98 William, N. Y. 6
Read D. W. R. & Co., 205½ Walnut, Phila. 5
Schoenberg Metal Mfg. Co., 528 & 530 E. 20th, N. Y. ..2
Starr John, Halifax, Nova Scotia 4
Metals, Perforated Sheet.
Harrington & Oglesby, Chicago, Ill. ....
Metallurgists.
Booth, Garrett & Blair, 919 Chant, Philadelphia 5
Britton J. Blodgett, 320 Walnut, Philadelphia 22
Mica.
Peckham J. S. & M., Utica, N. Y. 21
Mine Lamps.
Leonard Bros., Scranton, Pa. 24
Miners' Candles. *Makers of.*
James Boyd's Sons, 10 and 12 Franklin, N. Y. 28
Mineral Wool.
Elbers Alexander D., 26½ Broadway, N. Y. 27
Molasses Gates.
Kimball Shovel Co., Baltimore, Md. 29
Molding Sand.
Whitehead Bros., 537 W. 15th, N. Y. 3
Mouse Traps.
Dietz R. E., 54 and 56 Fulton, N. Y. 38
Jones Claudius & Co., Erie, Pa. 12
Ripley Mfg. Co., Unionville, Conn. 31
Nails.
Fuller Bros. & Co., 139 Greenwich, N. Y. 4
Oxford Iron Co., 81 Washington, N. Y. 4
Rowland Jas. & Co., 920 N. Delaware, Ave., Phila. 5
Schoenberger & Co., Pittsburgh, Pa. 4
Zug & Co., Pittsburgh, Pa. 4
Nail Machinery.
Pittsburgh Mfg. Co., Pittsburgh, Pa. 36
Nickel Platers' Supplies.
Condit, Hanson & Van Winkle, Newark, N. J. 29
Wharton Joseph, Philadelphia, Pa. 20
Zucker & Levett, 540 to 544 West 16th st., N. Y. 23
Norway Shapes, *Rollers of.*
Naylor & Co., 99 John, N. Y. 30
Rowland Wm. & Harvey, Frankford, Philadelphia. 38
Nuts, Bolts, etc., *Makers of.*
Allentown Rolling Mill Co., Allentown, Pa. 5
Haskell W. H. & Co., Pawtucket, R. I. 35
Russell, Burdsall & Ward, Port Chester, N. Y. 38
Standard Nut Co., Pittsburgh, Pa. 35
Sternbergh J. H., Reading, Pa. 38
Oil, Lubricating.
Belmontyle Oil Co., 150 Front, N. Y. 22
Meriam & Morgan Paraffine Co., Cleveland, O. 30
Oil Stones.
Boyd & Chase, 107th and Harlem River, N. Y. 30
Ores.
Jackson Iron Co., Cleveland, O. 6
Llera J., 77 William, N. Y. 6
Pullman J. Wesley, 407 Walnut Philadelphia 5
Read D. W. R. & Co., 205½ Walnut, Philadelphia ..5
Ox Shoes.
Greenfield Tool Co., Greenfield, Mass. 10
Packing.
Akron Rubber Co., Akron, O. 13
Katzenstein L. & Co., 35 Desbrosses, N. Y. 37
Patent Solicitors.
Howson & Son, Phila. and Washington, D. C. 35
Stetson Thomas D., 23 Murray, N. Y. 35
Tracy, Dyer & Wilber, Cleveland, O. 29
Pattern Letters and Figures.
Knight H. W., Seneca Falls, N. Y. 7
Pens, Steel.
Esterbrook Steel Pen Co., New York 13
Phosphor Bronze.
Kaufman A., 36 Park Place, N. Y. 25
Phosphor Bronze Smelting Co., Limited, 2038 Washington ave. Philadelphia 22
Picks, *Makers of.*
Pierson & Co., 24 Broadway, N. Y. 4
Pipes, Fittings, etc., *Makers of.*
McNab & Harlin Mfg. Co., 56 John, N. Y. 35
Pancoast & Maule, 227 Pear Philadelphia 34
Pipe, Water and Gas, *Makers of.*
McNeal A. H. & Bro., Burlington, N. J. 6
Mellert Foundry and Machine Co., Limited, Reading, Pa. 6
Reading Iron Works, Philadelphia, Pa. 5
Wood R. D. & Co., 400 Chestnut, Philadelphia 13
Wyckoff A., Elmira, N. Y. 29
Plane Irons, *Manufacturers of.*
Buck Bros., Millbury, Mass. 21
Greenfield Tool Co., Greenfield, Mass. 10
Planes, *Manufacturers of.*
Greenfield Tool Co., Greenfield, Mass. 10
Laflin Mfg. Co., Westfield, Mass. 29
Stanley Rule and Level Co., 29 Chambers, N. Y. 3
Plated Ware.
Hall, Elton & Co., 75 Chambers, N. Y. 11
The Wm. Rogers Mfg. Co., Hartford, Ct. 11

Plumbers' Materials, *Manufacturers of.*
Everhart Jas. M., Scranton, Pa. 38
Pocket Knives.
Boker Hermann & Co., 101 Duane, N. Y. ....28&34
Pots and Kettles, Tea and Coffee.
Ideal Coffee Pot Co., Philadelphia, Pa. 33
Purvis R. C., Philadelphia 25
Power Hammers.
Dienelt Eisenhardt & Co., Philada., Pa. 36
Presses, Fruit and Vegetable.
Mohawk & Hudson Mfg. Co., Waterford, N. Y. 25
Presses, Power, *Makers of.*
Bliss & Williams, 167 Plymouth, Brooklyn 36
Merriman A. H., West Meriden, Conn. 37
Peerless Punch & Shear Co., 52 Dey, N. Y. 37
The Stiles & Parker Press Co., Middletown, Ct. 38
Pulleys.
Penfield Block Works, Lockport, N. Y. 36
Providence Tool Co., Providence, R. I. 21
Pumps, *Makers of.*
Douglas W. & B., Middletown, Conn. 7
Gunnison A. B., Erie, Penn. 25
Hartford Compressed Air Pump Co., Hartford Conn. 34
Pulsometer Steam Pump Co., 83 John, N. Y. 37
Rumsey & Co., Seneca Falls, N. Y. 7
Rumsey L. M. & Co., St. Louis, Mo. 11
Union Mfg. Co., 96 Chambers, N. Y. 7
Rails, Iron and Steel, *Makers of.*
Allentown Rolling Mill Co., Allentown, Pa. 5
Bates & Despard, 117 Pearl, N. Y. 4
Cambria Iron Co., Johnstown, Pa. 5
Cleveland Rolling Mill Co., Cleveland, Ohio 30
Montour Iron & Steel Co., Danville, Pa. 3
The Edgar Thomson Steel Co., 57 Broadway, N. Y. ..31
Razors.
Tower L. C., Rochester, N. Y. 10
J. R. Torrey Razor Co., Worcester, Mass. 10
Rivets.
Falls Rivet Co., Cuyahoga Falls, Ohio 22
Gilmor Wm., of Wm., Baltimore, Md. 38
Grundy Geo. C., 165 Greenwich, N. Y. 12
Hoopes & Townsend, Philadelphia, Pa. 35
Townsend W. P. & Co., Pittsburgh, Pa. 33
Rock Breakers.
Blake Crusher Co., New Haven, Conn. 34
Farrel Foundry and Machine Co., Ansonia, Conn. ..34
Gates & Scoville Iron Works, Chicago, Ill. 38
Rolls (Chilled).
Garrison A. & Co., Pittsburgh, Pa. 6
Roofing.
New T., 39 John, N. Y. 12
Rules, *Manufacturers of.*
Stanley Rule and Level Co., 29 Chambers, N. Y. 3
Sad Irons.
Chalfant Mfg. Co., 435 Arch, Philadelphia 13
Enterprise Mfg. Co., Philadelphia 37
Sand and Emery Paper, *Makers of.*
Baeder, Adamson & Co., 730 Market, Philadelphia..
Sand Sifter.
Richlé Bros., Philadelphia, Pa. ....12&23
Sash Locks.
Universal Sash Lock Co., Albany, N. Y. 22
Saw Sets.
Farr Asa, 64 College Place, N. Y. 21
Saws, *Makers of.*
Boynton E. M., 80 Beekman, N. Y. 38
Disston Henry & Sons, Phila. 32
Farmers' Mfg. Co., Cincinnati, O. 29
Gerlach Peter & Co., Cleveland, Ohio ....
Wheeler, Madden & Clemsen Mfg. Co., Middletown, N. Y. 32
Scales, *Manufacturers of.*
Arnold & Rowe, Troy, N. Y. 22
Buffalo Scale Co., Buffalo, N. Y. 13
Chatillon John & Sons, 91 Cliff, N. Y. 9
Olsen Tinius & Co., Philadelphia 21
Riehle Bros., 9th above Master, Phila. ....10&21
Weeks & Ray, Buffalo, N. Y. 11
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Miles F. S., 205 Quarry, Phila. 13
Philadelphia Screw Co., Philadelphia, Pa. 34
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Beardsley Scythe Co., West Winsted, Conn. 30
Scythe Stones.
Pike A. F., Pike Station, N. H. 11
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Hull J. E., Cincinnati, O. 35
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Hunter J. M. & Co., Cincinnati, O. ....
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Vermont Snath Co., Springfield, Vt. 25
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Rowland Wm. & Harvey, Frankford, Phila. 38
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Dienelt, Eisenhardt & Co., Philadelphia, Pa. 36
Dudgeon Richard, 24 Columbia, N. Y. 9
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McGowan John H. & Co., Cincinnati, O. 37
Storer G. W., 122 N. 3d, Philadelphia 36
The Norwalk Iron Works Co., So. Norwalk, Ct. 35
Valley Machine Co., Easthampton, Mass. 37
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Eureka Cast Steel Co., Chester, Pa. 38
Flagg Stanley G. & Co., Philadelphia 38
Pittsburgh Steel Casting Co., Pittsburgh, Pa. 38

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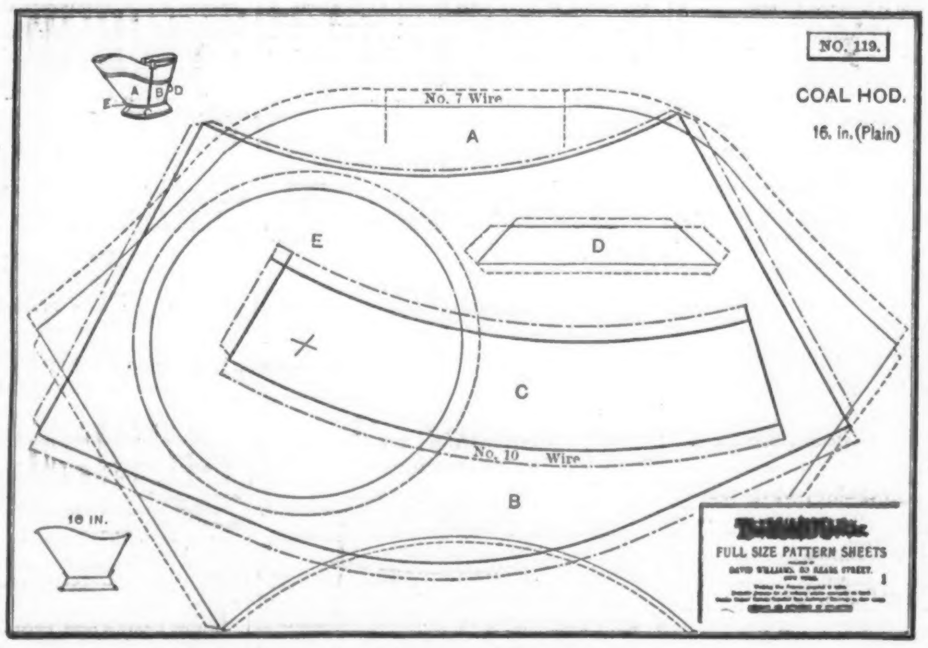
The Metal Worker patterns are neatly printed on sheets of white paper. Transfers to the tin may be made from them by pricking through, or by any other plan suiting the purchaser.

The net patterns are shown by solid lines, while edges and allowances for joints are shown by dotted lines. By this arrangement edges may be varied to suit the taste of the workman, or to adapt the patterns to different machines and to different grades of stock.

EVERY PATTERN IS TESTED AND ALL ARE WARRANTED.

Dimensions of the finished articles are shown upon the pattern sheets by diagrams. Size of wire for which edges have been calculated is stated in figures. Actual capacity is given in connection with all articles usually designated by contents.



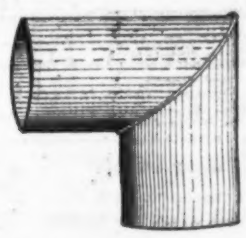
Miniature Fac Simile (Quarter Full Size) of one of The Metal Worker Full Size Pattern Sheets.

Each pattern is calculated to cut material to the best advantage, and a diagram showing how the parts may be placed upon the stock to cut economically is printed upon each pattern sheet.

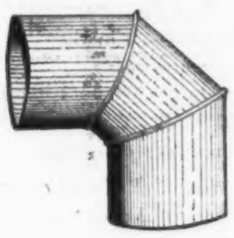
A memorandum of the quantity of material required to cut a dozen or a gross, as the case may be, also accompanies each sheet. In short, we have spared neither labor nor expense in producing patterns of the most desirable character for tinners' use.

CATALOGUE.

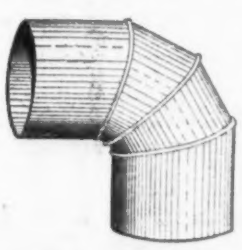
STOVE PIPE ELBOWS.



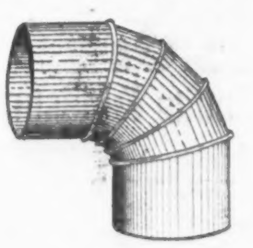
No.	Size of pipe		Pieces	Price.
No. 35	4	ins.	2	$0.25
" 39	4½	"	2	.25
" 43	5	"	2	.25
" 47	5½	"	2	.25
" 51	6	"	2	.25
" 55	6½	"	2	.25
" 59	7	"	2	.25



No. 36	4	ins.	3 Pieces	$0.25
" 40	4½	"	3 "	.25
" 44	5	"	3 "	.25
" 48	5½	"	3 "	.25
" 52	6	"	3 "	.25
" 56	6½	"	3 "	.25
" 60	7	"	3 "	.25



No. 37	4	ins.	4 Pieces	$0.25
" 41	4½	"	4 "	.25
" 45	5	"	4 "	.25
" 49	5½	"	4 "	.25
" 53	6	"	4 "	.25
" 57	6½	"	4 "	.25
" 61	7	"	4 "	.25



No. 38	4	ins.	5 Pieces	$0.25
" 42	4½	"	5 "	.25
" 46	5	"	5 "	.25
" 50	5½	"	5 "	.25
" 54	6	"	5 "	.25
" 58	6½	"	5 "	.25
" 62	7	"	5 "	.25

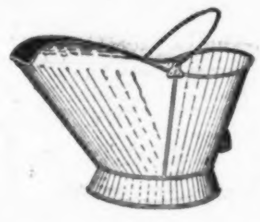
COAL HODS (Plain).

No.	Inches.	Price.
117	14	$0.25
118	15	.25
119	16	.25
120	17	.25
121	18	.25

COAL HODS (Funnel).

No.	Inches.	Price.
123	16	$0.25
127	18	.25
128	19	.25

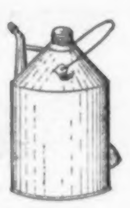
COAL HODS ("Utility").



Front of Hod has High Sides or Guards.

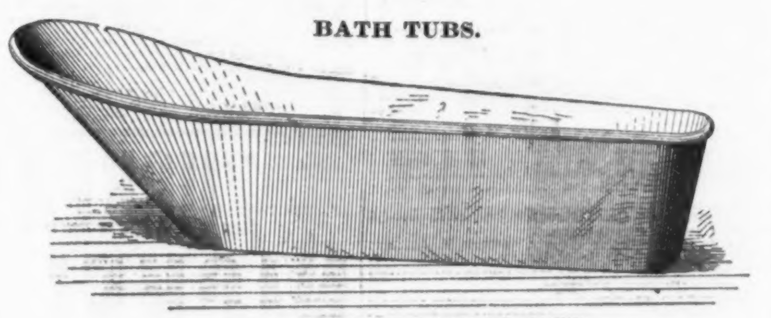
No.	Inches.	Price.
129	14	$0.25
130	15	.25
131	16	.25
132	17	.25
133	18	.25

KEROSENE CANS (with Spouts).



No.	Nominal Capacity.	Price.
71	1 quart	$0.25
72	2 "	.25
73	4 "	.25

BATH TUBS.



Number.		Price.
108	Plunge Bath (6 feet)	$1.00

COFFEE POTS (with Spouts).

No.	Actual Capacity.	Price.
63	1 quart	$0.25
64	1¾ "	.25
65	2¾ "	.25
66	3¾ "	.25

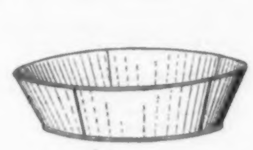
WATER PITCHERS.

No.	Capacity.	Price.
125, with Lip	2 quart	$0.25

LIPPED MEASURES.

No.	Capacity.	Price.
97	¼ pint	$0.25
98	½ "	.25
99	1 "	.25
100	1 quart	.25
101	2 "	.25
102	1 gallon	.25
103	2 "	.25

ROUND FLARING PANS.



No.	Depth.	Actual Capacity.	Price.
1	2½ ins.	1¾ pints	$0.25
2	2½ "	2½ "	.25
3	2½ "	3 1-7 "	.25
4	3⅛ "	2⅓ quarts	.25
5	3⅜ "	3 1-7 "	.25
6	3⅛ "	2¾ "	.25
7	2⅔ "	4 "	.25
8	3 "	5 1-6 "	.25
9	3½ "	8 "	.25
11	3¼ "	6 "	.25
12	3½ "	10 "	.25

MILK STRAINER PAILS.

No.	Nominal Capacity.	Price.
80	6 quarts	$0.25
81	10 "	.25
82	14 "	.25

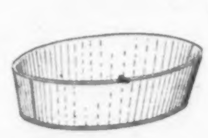
COFFEE BOILERS (With Lips).

No.	Actual capacity.	Price.
22	1 quart	$0.25
23	1¾ "	.25
24	2¾ "	.25
25	3¾ "	.25

WATER PITCHERS.

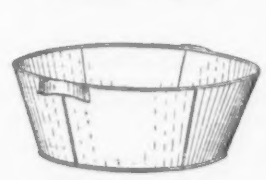
No.	Capacity.	Price.
126, Fancy Top	2 quart	$0.25

OVAL FLARING PANS.



No.	Depth.	Actual Capacity.	Price.
19	3½ ins.	6½ quarts	$0.25
20	3¼ "	4 "	.25
21	2⅞ "	2½ "	.25

DISH PANS.



No.	Depth.	Actual Capacity.	Price.
10	6 1-6 ins.	10 qts.	$0.25
13	5⅞ "	12 "	.25

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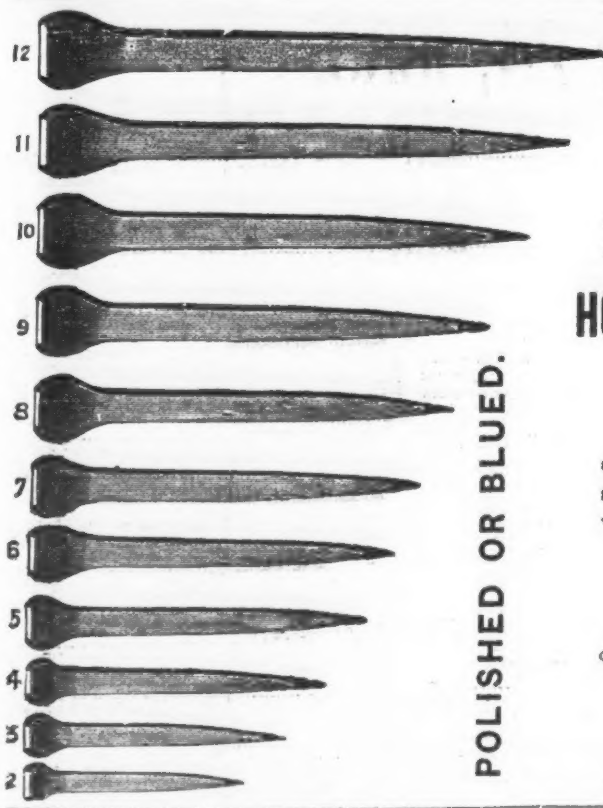

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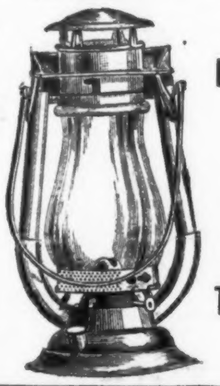

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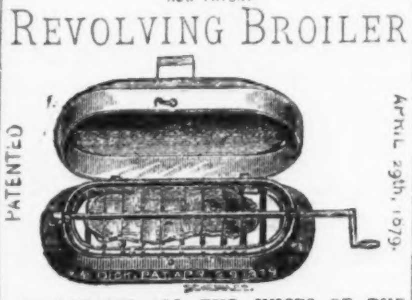

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BARGAINS IN

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The best made. 2½ to 15-horse power. Write for full particulars to

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Wholesale Manufacturer of

Coal Hods,

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Grant Fan Mill & Cradle Co.

Manufacturers of

Grant's Grain, Coffee, Rice, Cochineal and Pimento Fans,

and

TURKEY WING GRAIN CRADLES, 4, 5 and 6 fingers.

GRAPE VINE GRAIN CRADLES. 4 fingers.

SOUTHERN PATTERN GRAIN CRADLES, 4, 5 and 6 fingers.

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STAR LOCK WORKS.

ESTABLISHED 1836.

Trunk Locks, Pad Locks, Dead Latches, Door Springs, Trunk Stays, Keys, &c., &c.

110 South 8th St., and Sansom, bet. 8th and 9th, PHILADELPHIA.

PATENTED

Scand. Pad Locks

With Flat Keys.

Shackel secured to the Lock Box.

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LAMBERSON'S PRICE BOOKS.

Full Leather, $7.50. Half Leather, $6.50. Pocket Edition, Full Leather, $3.50.

DISCOUNT Bolt List, $1.50. Screw List, 50 cents.

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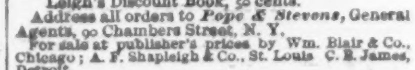
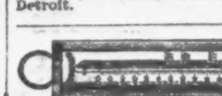
For sale at publisher's prices by Wm. Blair & Co., Chicago; A. F. Shapleigh & Co., St. Louis C. B. James, Detroit.



Oswego Thermometer Works, Oswego, N. Y.



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VALVES.

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Axe, Hatchet, Powder and Brush Machinery.

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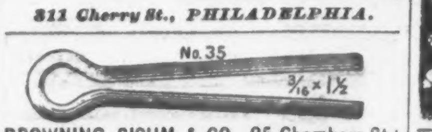
WATERFORD, N. Y.

BENTON, FAULKNER & BIRD, N. Y. Agents.

PANCOAST & MAULE, Phila. Agents.



BROWNING, SISUM & CO., 85 Chambers St.,

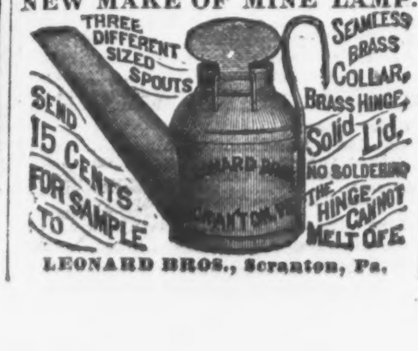
Manufacture

Belt Hooks, Cotters, Spring Keys, D Rings, Staples, and everything pertaining to wire bending. Factory, BROOKLYN.

PATENTS.

THOMAS D. STETSON, 23 Murray St., N. Y., Patent Solicitor and Expert.

NEW MAKE OF MINE LAMP.



LEONARD BROS., Scranton, Pa.

S. CHENEY & SON,

Manlius, N. Y.,

Small Gray Iron Castings.

We warrant our work for smoothnes and finish.

New York Wholesale Prices, November 24, 1880.

HARDWARE.

Anvils.
Eagle Anvils American .... ₩ ℔ 10c dis 20 %
Wright's 10½c
Armitage's Mouse Hole .... 9¾ @ 9⅞c
Trenton 10½c

Anvil, Vise and Drill.
Millers Falls Co., $18.00 .... dis 20 %

Augers and Bits.
Conn. Valley Mfg. Co.
Douglass Mf. Co.
Humphreysville Mfg. Co.
Ives
Snell (French, Swift & Co)
Griswold
Nobles Mfg. Co.
Kasson's Patent
— dis 40 % from list of Jan. 7, 1880
Cook's, Douglass Mfg. Co. .... dis 40&10 %
Snell Mfg. Co.'s C. S. Augers .... dis 40 %
" " B. Machine .... dis 40 %
" " C. S. Bits .... dis 40 %
" " Jennings' Bits .... dis 35 %
Patent Solid Head .... dis 40 %
Lewis' Patent Single Twist .... dis 33⅓ %
Russell Jennings' Auger, Dowel, Machine-Dowel and Hand-Rail Bits .... dis 20&10 %
Russell Jennings' Augers .... dis 16⅔&10&10 %
Russell Jennings' Car and Machine Bits, Boring-Machine and Millwrights' Augers .... dis 25&10&10 %
Imitation Jennings Bits .... dis 40&5 %
Ives' " Jennings" Bits .... dis 33⅓ %
Andrews Bits .... dis 40 %
Expansive Bits, Clark's, small, $18; l'ge, $26 .... dis 33⅓ %
" Ives' .... $20 @ $30—dis 33⅓ %
" Blake's .... dis 40 %
" Parmelee's .... $20 and $30—dis 33⅓ %
Hollow Augers Ives' .... dis 15 %
" Swift & Co.
" Douglass .... dis 15 %
" Bonney's Adjust .... ₩ doz $36—dis 20 %
" Stearns' Adjust .... ₩ doz $48—dis 20 %
" Ives' Expansive .... each $4.00—dis 20 %
" Univ'sal Expansive, each $4.50—dis 20 %
Woods .... dis 40 %
Gimlet Bits .... $7.00 ₩ gross, dis 40 %
" Diamond .... ₩ doz $1.10 dis 30&5 %
" "Bee" .... dis 50&5 %
Double Cut Gimlet Bits Shepardson's .... dis 30 %
" Ct. Valley Mfg. Co. .... dis 30&10 %
" Hartwell's .... dis 20&10 %
" Douglass' .... dis 40 %
" Ives' .... dis 40 %
Morse Bit Stock Drill .... dis 25 %
L'Hommedieu's Ship Augers .... dis 15 %
Watrous Ship Augers .... dis 10 %
" Extension Lip .... dis 30 %

Awl Hafts.
Sewing Brass Ferrule .... $3.50 ₩ gross—dis 40&10 %
" " .... 3.50 " dis 40&10 %
Patent Sewing, Short .... $1.00 ₩ doz—dis 40&10 %
" " Long .... $1.40 ₩ doz—dis 40&10 %
Patent Peg Plain Top .... $10.00 ₩ gross—dis 40&10 %
" " Leather Top .... 12.00 dis 40&10 %

Awls, Brad Sets, &c.
Awls Sewing, Common .... ₩ gross $2.40—dis 25&10 %
" Shouldered Peg .... ₩ gross 2.45—dis 25&10 %
" Patent Peg .... ₩ gross .65—dis 25&10 %
" Shouldered Brad .... ₩ gross 2.45—dis 25&10 %
" Handled Brad .... ₩ gross $7.00—dis 25&10 %
" Handled Scratch .... ₩ gross $10—dis 25&10 %
" Socket scratch .... $1.00@$1.25 ₩ doz—net
Brad Sets, Aiken's .... ₩ doz $15.00—dis 40&10 %
" No. 41, $10.50; No. 42, $10.00 .... dis 40 %
" Stanley's Excelsior, No. 1, $9.00 .... dis 20&10 %
" No. 2, 4.80 .... dis 20&10 %
" No. 3, 7.80 .... dis 20&10 %

Axes.
Single Bit, 4½ to 5½ and under .... ₩ doz $11.00 net
" 5½ to 6 and over .... ₩ doz $11.50 net
" Beveled .... 50c ₩ doz advance
Double Bit, 4½ to 5½ and under .... ₩ doz $15.00 net
" 5½ to 6 and over .... ₩ doz $15.50 net
" Beveled .... $1.00 ₩ doz advance

Axle Grease.—Frazer's .... ₩ ℔ 8c

Bag Holders.
Sprengle's Patent, per doz. $18 .... dis 40 %

Balances.
Ut Spring Balances .... dis 25&10 %

Bells.
Hand, Light Brass .... dis 60&10 %
" Extra Heavy .... dis 45 %
" White Metal .... dis 60&10 %
" Silver Chime .... dis 20&10 %
" Globe (Cone's Patent) .... dis 50 %
Gong, Abbe's .... dis 25&10 %
" Yankee .... dis 40 %
" Barton's .... dis 40 %
Crank Taylor's .... dis 40&10 %
" Brook's .... dis 40&10 %
" Cone's .... dis 40&10 %
" Connell's .... dis 40&10 %
Lever, Sargent's .... dis 40&10 %
" Taylor's Bronze or Plated Lever .... net
" Japanned Lever .... dis 40&10 %
" R. & E. M. Co.'s .... dis 40&10 %
Pull, Brook's .... dis 40&10 %
" Western .... dis 40&10 %
Call .... dis 40&10 %
Cow, Common Wrought .... dis 40&10 %
" Western .... dis 40&10 %
" Sargent's new list .... dis 40&10 %
" Kentucky "Star" .... dis 40&10 %
" Sargent's new list .... dis 40&10 %
Dodge's Genuine Kentucky, new list.
Nos. 0 1 2 3 4 5 6 Hog
$11.00 10.00 9.00 8.00 6.00 5.00 3.50 2.50 5.00 dis 50&10 %

Bellows.
Blacksmiths', Common .... dis 45 %
" Extra and Pittsburgh Pattern .... dis 40 %
Moulders .... dis 25 %
Hand Bellows .... List of Dec. 1, 1879, dis 60 %

Belting, Rubber.
N. Y. Belting and Packing Co. .... new list net

Bit Holders.
Extension, Barber's .... ₩ doz $15.00—dis 40&5 %
" Ives' .... dis 40 %
Diagonal .... ₩ doz $24.00—dis 40&5 %
Angular .... ₩ doz $24.00—dis 40&5 %

Blind Adjusters.—Domestic .... ₩ doz $3.00, dis 25 %

Blind Fasteners.
Mackrell's .... per doz. pairs, $1.00, dis 20 %
Van Sand's .... dis 50&10 %
" old pattern .... ₩ gross, $9.00 net
Washburn's Patent .... dis 25 %
Merriman's .... dis 25 %
Mc Kinney's .... per doz. pairs, $0.65, dis 25 %

Blind Staples.
Barbed, ⅞ in. and larger .... ₩ ℔ 12c net
" ¾ in .... ₩ ℔ 16c net

Blocks.
Differential Pulley Blocks .... dis 40&10 %
Penfield Block Works, Rope and Iron Strap'd .... dis 40 %
" Wrot. Iron Com. bushed .... dis 45 %
" all steel roll'r .... dis 40 %
Sheaves
Stanley R. & L. Co., Rope and Iron Strap'd .... dis 40&10 %

Bolts.
Cast Iron Barrel, Shutter, &c .... dis 50&10 %
Cast Iron Chain, Sargent's list .... dis 60&10&10 %
Sargent's Lever and Chain Bolts .... dis 60&10 %
Ives' Pat. Door Bolts .... dis 40 %
Wrought Barrel .... dis 60&10 %
" Square .... dis 60&10 %
" Shutter, all Iron, Stanley's list .... dis 60&10 %
" Brass Knob .... dis 60&10 %
" Sargent's list .... dis 60&10 %
Sunk Flush, Sargent's .... dis 40&5 %
" Stanley's .... dis 40&5 %
B. E. Flush, Com'n, Stanley's .... dis 40&5 %
" Ex. Heavy .... dis 40&5 %
" Plated Knob & Slide Flush .... dis 40&5 %
Carriage and Tire, Common .... dis 70 %
" " Philadelphia, new list .... dis 75 %
" " Philada. Pattern .... dis 75 %
" " Shelton's .... dis 75 %
" " R. B. & W. .... dis 75 %
R. B. & W. Carriage (old list) .... dis 75 %
East. Am. Screw Co.'s Phila. new list, Nov 1, '79, dis 75 %
" Bay State .... dis 75 %
Stove—American Screw Co.'s .... dis 75 %
" R. B. & W. .... dis 75 %
Plow .... dis 75 %
" R. B. & W. .... dis 75 %
Machine .... dis 75 %
Bolt Ends .... dis 75 %

Borax. .... ₩ ℔ 12½@13c net

Boring Machines. Upright. Angular.
First quality no Augers .... $6.75 net $8.75 net dis 40 %
Phillips' with Augers .... 6.50 7.00 net

Braces.
J. S. Backus .... dis 50 %
Wilson .... dis 50 %
Barbers .... dis 50 %
Spofford's Patent .... dis 50 %
Noble's Patent .... dis 50 %
Ives' Patent Braces .... dis 50 %
Common Ball (American) .... dis 40 %
Amidon's .... dis 50 %
Barker's Impd .... dis 50 %
Empire .... dis 50 %
Buffalo Ball .... dis 40 %

Brackets.—Shelf (Sargent's) .... dis 70 %

Bright Wire Goods List of Dec. 15, 1879, dis 60&10 %

Ball Rings.—Union Nut Co. .... dis 40 %
" Rensalus .... low list net
Humason, Beckley & Co.'s .... dis 40 %

Butts.
Wrought Brass .... dis 45 %
Cast Brass, Tiebout's .... dis 45 %
" Corbin's .... dis 40&10 %
Fast Joint, Narrow .... dis 40&10 %
" Broad .... dis 40&10 %
Loose Joint
" Japanned .... dis 45&10 %
" with Acorns .... dis 40&10 %
" Japanned, with acorns .... dis 40&10 %
Parliament Butts .... dis 45&10 %
Mayer's Hinges .... dis 55&10 %
Loose Pin and Acorn .... dis 45&10 %
" Acorns .... dis 45&10 %
" Japanned .... dis 45&10 %
" Plated Tips .... dis 55&10 %
WROUGHT IRON.
Fast Joint Narrow .... dis 40&10 %
" Lt. Narrow .... dis 40&10 %
" Broad .... dis 40&10 %
Loose Joint, Broad .... dis 40&10 %
Table Butts, Back Flaps, &c .... dis 40&10 %
Inside Blind, Regular .... dis 40&10 %
" Light .... dis 40&10 %
Loose Pin, Wrt .... dis 50&10 %
Spring Hinges—
American Spiral Spring Butt Co., Jap'd .... dis 40 %
" " Fancy .... dis 20 %
Gem Spiral Spring Butts, Japanned .... dis 25 %
" " Ornamental .... dis 20 %
Geer's Spring and Blank Butts .... dis 40 %
Stanley Mfg. Co.'s Double Acting .... dis 25 %
Shepard's Spring .... dis 25 %
Union Spiral Spring, Japanned .... dis 25 %
" Ornamental .... dis 20 %
Union Spring Hinge Co.'s .... dis 25 %
American Spring Hinge Co.'s .... dis 25 %
Union Mfg. Co .... dis 25 %
Bommer's .... dis 25 %
Blind Butts, Parker .... dis 50&10 %
" Palmer .... dis 50&10 %
" Seymour .... dis 50&10 %
" Shepard's "Double Locking" Nos. 1 & 2 .... dis 60&10 %
" Shepard's "Noiseless," Nos. 49 & 50 .... dis 60&10 %
" Lull & Porter .... dis 60&10 %
" Nicholson .... dis 40&10 %
" Huffer .... dis 60&10 %
" Clark's, Nos. 1, 3, 5 .... dis 60&10 %
" Sargent's No. 12 .... dis 7, 20 %

Bow Pins.
Rotchkiss' .... low list net
Humason, Beckley & Co.'s .... dis 30 %
Sargent & Co.'s .... $19.70 and $21.10, dis 50&10 %

Butchers' Cleavers.
Humason & Beckley Mfg. Co .... dis 30 %
Bradley's .... dis 30 %
Beatty's .... dis 35&5 %
1 2 3 4 5 6 7 8
$20.50 19.00 21.60 24.00 27.00 30.00 33.50 36.50

Can Openers.
Messenger's Comet .... ₩ doz $3.00, dis 25 %
American .... ₩ gross $7.50 dis 25 %
Duplex .... ₩ doz 240. dis 10@20 %
Lyman's .... ₩ doz $5.75, dis 30 %
No. 4, French .... ₩ doz $1.75, dis 30 %
No. 5, Iron Handle .... ₩ gross $7.50 dis 30 %
Eureka .... ₩ doz $2.50, dis 25 %
Sardine Scissor .... ₩ doz $7.00, dis 25 %
Star .... ₩ doz $4.00, dis 33⅓ %
Sprague .... dis 25 %

Caps—Percussion. ₩ 1000.
U. M. C. F. C. trimmed .... .50c dis 10 %
" F. ground .... .60c dis 10 %
U. M. C. Cen. fire ground .... .70c dis 10 %
" Double W. proof .... $1.40 dis 10 %
G. D. & E. B. .... .90c dis 7½ %
Double Waterproof, in 1-10's .... $1.30 dis 5 %
Colt's Pistol .... $1.00 dis 5 %
F. L. .... .40c dis 5 %
E. B. 1-10, Trimmed .... .60c dis 5 %
E. B. 1-10, Ground Edge .... .70c dis 5 %
Musket, in 1-10's .... .75c net

Cartridges.—Rim .... dis 40&10 %
Central Fire .... dis 20 %

Cards.—Horse and Curry.
Cotton .... dis 10 %
Wool .... dis 10 %

Carpet Stretchers.
Cast Steel, Polished .... ₩ doz $5.00, dis 30
" Iron Steel Points .... ₩ doz $5.50, dis 30
Bullard's .... dis 25 %

Casters.
Bed .... new list July, '80, dis 50&10 %
Plate and Shallow Socket .... dis 50&10 %
Deep Socket .... dis 50&10 %

Cattle Leaders.
Humason, Beckley & Co.'s .... dis 60&10 %
Sargent's .... dis 60&10 %

Chain.
Trace, 6½-1-2 .... ₩ pair 70c
" 6½-10-3 .... ₩ pair 80c dis 40 %
" 6½-10-3 .... ₩ pair 90c
German Halter Chain, New list Oct. 22, '79, dis 60&10 %
" Coil, New list Oct. 22, '79 .... dis 60&10 %
Covert Halter, Hitching and Breast .... dis 35 %
Oneida Halter Chain .... dis 33⅓ %
Galvanized Pump Chain .... ₩ ℔ 8c
Jack Chain, Iron .... dis 60 %
" Brass .... dis 60 %

Chalk.
White .... ₩ gross 60c net
Red .... ₩ gross 90c net
Blue .... ₩ gross 90c net
White Crayons .... ₩ gross 100 net

Chisels.
Socket Framing, Crossman .... dis 65&5 %
" Buck Bros .... new list, dis 25 %
" Merrill .... dis 60&10 %
" Winsted Tool Co .... dis 60&10 %
" Douglass .... dis 60&10 %
Firmers, Crossman .... dis 65&5 %
" Buck Bros .... new list, dis 22½ %
" Merrill .... dis 60&10 %
" Witherby Tool Co .... dis 60&10 %
" Douglass .... dis 60&10 %
" Corner .... dis 25 %
Tanged Firmers extra .... dis 33⅓&5 %
" Butcher's .... $5.00 @ $5.75 net
" Spear & Jackson's .... 5.00 to
" Buck Bros (Shank) 5.25

Clamps.
Iron, Providence Tool Co.'s, Wrt. Iron .... dis 25 %
" Adjustable, Gray's .... dis 25 %
" Snow's .... dis 25 %
" Lambert's .... dis 25 %
" Hammer's .... dis 25 %
" Stearns' .... dis 25 %
" Cabinet, Sargent's .... dis 25 %
" Carriage Makers', Sargent's .... dis 25 %
" Cord and Tape (T. & S. Mfg. Co.) .... dis 25 %

Clips, Axle.
Norway or Best .... dis 40&10 %
Superior .... dis 40&10 %

Coal Hods.
Griffiths .... dis 33⅓ %

Cockeyes .... dis 25 %

Cocks, Brass.
Racking .... new list, July 19, '80
Globe .... dis 40 %
Plain Bibbs
Ale and Beer

Coffee Mills.
Board and Box .... new list, Jan., 1880, dis 35 %
Increase Wilson's .... net
Selsor's Pat .... $5.50, $10.50, dis 25 %
American (Enterprise Mfg. Co.) .... dis 25 %
French Steel .... dis 25 %
The Swift (Lane Bros.) .... dis 25 %

Combined Dinner Pail and Lantern.
Per doz $11.00 .... dis 30 %

Compasses, Dividers, &c.
Compasses .... dis 55 %
Calipers .... dis 55 %
Dividers .... dis 55 %
Bemis & Call Co.'s Dividers .... dis 35 %
" Compasses & Calipers .... dis 35 %
" Wing & Inside or Outside .... dis 35 %
" Double .... dis 35 %
" Call's Pat. Inside .... dis 35 %
Cook's .... dis 35 %
Excelsior .... dis 35 %
Miller's Patent .... dis 35 %

Coopers' Tools.
Bradley's .... dis 15 @ 20 %

Corkscrews.—Humason & B. .... dis 25 %
Clough's Wire .... dis 33⅓ %

Corn Knives and Cutters.—Bradley's .... dis 33⅓ %
Wadsworth's .... dis 33⅓ %

Crow Bars.
Cast Steel .... ₩ ℔ 8c
Iron, Steel Points .... ₩ ℔ 5c

Curling Irons, &c.
½, ⅝, ¾ in., $1.80 2.00, 2.40 ....
Curling tongs .... ₩ doz $3.75, dis 10 %
Pinching Irons .... ₩ doz 7.50, dis 10 %

Curry Combs.
Fitch's (List of No. 240, $5) .... dis 40 %
Hotchkiss Novelty .... new list, July, 1880, dis 25 %
" Excl. Eagle, Champion .... new list, July 1880, dis 25 %
Lawrence .... July 1880, dis 25 %
Lawrence, With detachable Mane Comb new list July 1880, dis 25 %
Rubber .... dis 25 %

Curtain Pins.—Silvered Glass .... net
White Enamel .... net

Cutlery.
Meriden Cutlery Co. (Table) .... net
Am. Miller Bro.'s Cutlery Co .... dis 25 %
Humason & Beckley, Pocket .... dis 33⅓ %
The Wm. Rogers Mfg. Co .... dis 50 %
Naugatuck Cutlery Co .... dis 25 %
Aaron Burkinshaw's Pocket .... dis 25 %

Dog Collars.
Embossed Gilt .... dis 50 %
Leather .... dis 50 %
Brass .... dis 50 %

Door Springs.
Torrey's Rod .... ₩ doz $2.10, dis 15 %
Gray's .... ₩ doz $1.70 net
Bee Rod .... ₩ doz $1.70 net
Warner's .... dis 15&10 %
Gem (Coil)—
No. 1, Large, Japanned .... ₩ doz $3.50
No. 2, Medium .... ₩ doz 2.50
No. 3, Small .... ₩ doz 2.00 dis 10 %
Challenge (Coil)—
doz. 9 7 5
Japanned .... ₩ doz $2.00 2.60 3.50
Coppered .... ₩ doz 4.00 4.50 5.00
Galvanized .... ₩ doz 3.50 4.00 4.40 dis 10 %
Nickeled .... ₩ doz 5.60 6.00 7.00
Star (Coil)—For Cop'd, Nickel-Plated, &c. new list.
No. 4, ("Snoo Fly") screen door size ₩ doz $1.80
No. 5, Screen Door Size .... ₩ doz $2.00
No. 6, Medium .... ₩ doz 2.50 dis 20 %
No. 7, Large .... ₩ doz 3.50
Sabin's Lever, No. 1, $1; 2 $1.50; 3, $2; 4, $2.50; dis 30 %
Sabin's Boss .... No. 1, $4.40; 2, $4.20; 3, $3.00 dis 40 %
Dunn's Coach .... ₩ doz $2.75, dis 25 %
Philadelphia .... 5 in., $5.00; 8 in., $7.00, dis 35 %
Barker's Concealed .... dis 20 %
Cowell's .... No. 1, $18.00; No. 2, $11.00 ₩ doz, dis 20 %
Rubber, complete .... ₩ doz $1.80, dis 10 %
Hercules .... dis 40&10 %

Drawing Knives.
Crossman's No. 1 .... dis 60&5 %
Merrill .... dis 60&10 %
Nobles Mfg. Co .... dis 60&10 %
Bradley's .... dis 35 %
Adjustable Handle .... dis 40 %
Witherby Tool Co .... dis 60&10 %
Douglass .... dis 60&10 %

Drills and Drill Stocks.
Blacksmiths' .... each $2.70 net
Blacksmiths' Self Feeding .... each $7.00, dis 25 %
Breast P. S & W .... dis 20&10 %
" Hotchkiss .... dis 20 %
Breast, Wilson's .... dis 40 %
" Miller's Falls .... each $5.00, dis 25 %
" Earsholomew's .... each $2.50 dis 25 %
Ratchet, Merrill's .... dis 25 %
" Ingersoll's .... dis 25 %
" Whitney's .... dis 20 %
" Weston's .... dis 20 %
" Moore's Triple Action .... dis 20 @ 25 %
Whitney's Hand Drill .... dis 20 %
Wilson's Drill Stocks .... dis 40 %
Automatic Boring Tools .... each $2.50, dis 25 %

Drill Chucks.—Morse's Beach Patent .... dis 20 %
" Adjust., each $10.00, dis 20 %
Danbury .... $8.00, dis 30 %

Egg Beaters.
Dover .... ₩ doz. $2.50 net
National .... ₩ doz $4.50, dis 33⅓ %
Family .... per gross $15; per doz., $1.10 net

Elevator Buckets.
Mill E. Buckets, light, 3½ to 10 in. (Duc's Improved) ₩ 100 $15.00 @ $84.00, net
Mill E. Buckets, heavy, 5 to 10 inches (Duc's Improved) ₩ doz $1.60 @ $10.20 net
Storehouse, (Duc's Patent) 12 to 17, $12.00 @ $20.00, net

Emery and Emery Paper.
Genuine Chester—Regular Nos .... ₩ ℔
" Flour and FF .... ₩ ℔
" in 10-lb. cans .... ₩ ℔ extra
Washington Mills—Regular Nos .... ₩ ℔ 8c
" Flour .... ₩ ℔ 8c
Excelsior Mills, Regular Nos., Grain in kegs .... ₩ ℔ 6c
" Flour and FF .... ₩ ℔
" 10-lb. cans .... ₩ ℔
Wellington Mills, Grain .... ₩ ℔ 8c
" Flour .... ₩ ℔ 8c net
Hampden Emery Grain .... 5c net
" Flour .... 5c net
B. & A. Emery Paper .... dis 20&10 %

Enameled and Tinned Ware.
Kettles .... dis 30 %
Sauce Pans .... dis 30 %
Tinned Sauce Pans .... dis 25 %

Escutcheon Pins.
Iron .... dis 60&10 %
Brass .... dis 60&10 %

Escutcheons.
Door Lock .... Same discounts as Door Locks
Brass Thread .... dis 60 %
Wood .... dis 60 %

Faucets.
Fenn's .... dis 25 %
Fenn's Cork Stops .... dis 33⅓ %
Star .... dis 50&10 %
Fary's Patent Petroleum .... dis 50&10 %
Wood and Metallic .... dis 40&10 %
West's Patent Key .... dis 40&10 %
Metallic Key, Leather Lined .... dis 40&10 %
Cork Lined .... dis 40&10 %
Enterprise (Self Measuring) .... ₩ doz. $36.00, dis 25 %

Felloe Plates. .... ₩ ℔

Files.
Auburn .... $5.00 to £, dis 35 %
Arcade .... $5.50 to £, dis 35 %
Black Diamond, new list .... dis 40 %
E. M. Boynton's .... dis 40 %
Nicholson .... (Nicholson List) dis 40 %
Nadeau & Cockayne File Co .... dis 40 %
Heller & Bros new list .... dis 40 %
Hiscox File Mfg. Co., new list .... dis 40 %
G. & H. Barnett .... dis 40 %
Johnson & Bro .... dis 40 %
Butcher's .... dis 20 %
Walter Spencer & Co.'s "Diamond" .... dis 35 %
Fisher's .... 4.75 to £
Moss & Gamble .... 4.75 to £
H. Disston & Sons (new list) .... dis 40 %
Western (new list) .... dis 40 %
Limet & Co. (French) .... dis 30 %
Union File Works (new list) .... dis 40 %

Fluting Machines.
Knox, 4-inch Rolls .... $3.25 each
" 6 " .... 4.00 each net
" 8 " .... 6.50 each
Peerless, 4-inch Rolls .... 4.00 each net
" 5 " .... 4.75 each net
Eagle, 3½-inch Roll .... $2.15, dis 10 %
" 5 " .... $2.85, dis 10 %
Eureka, No. 1, 7-inch Roll .... 5.00 each net
" No. 2, 6-inch Roll .... 4.00 each net
Crown, 4½-in., $3.50; 6-in., $4.00; 8-in., $6.50 each net
Crown Jewel .... each $3.50 net
American, 1-in., $4.50; 7 in., $4.50 each net, dis 25 %
Domestic Fluter .... 4.00 each net
Geneva Hand Fluter, No. 1 .... ₩ doz $21, dis 10 %
" Hand Fluter, No. 1, $21.00; No. 2, $12.00; 3 dis 10 %
Cron .... ₩ doz $18.00 dis 25 %
Shepard Hand Fluter .... No. 75 ₩ doz $21, dis 10 %
" No. 90, $20.00; No. 110, $7.25
" No. 120, $9.25; No. 130
" No. 140, $12.50, dis 10 %
Clark's Hand Fluter .... ₩ doz $21.00, dis 10 %
Combined Fluter and Sad Iron .... ₩ doz $18.00, dis 20 %
" Crown .... ₩ doz $24.00, dis 20 %

Fluting Scissors .... dis 30 %

Forks.
Hay, Manure and Sp'ding .... dis 50 %
Patent A. J. Rogers & Bro .... dis 33⅓&5 %
" Reed & Barton .... dis 50 %

Fruit and Jelly Presses.
Enterprise Mfg. Co .... dis 25 %
American .... dis 25 %

Fry Pans.
Burnished, list as follows .... dis 67 %
No. 0 1 2 3 4 5 6 7 8
₩ doz. $5.00 $5.75 4.25 4.75 5.25 6.00 7.00 8.00
"Acme" .... dis 50 %
Am. Acme .... dis 45 %

Gauges.
Marking, Stanley's .... dis 25 %
" Chapin's .... dis 25 %
Wire .... dis 25 %
" Smith's Patent .... ₩ doz $18.00, dis 25 %

Gimlets.
Nail and Spike .... dis 45 %
"Bee" Gimlets .... ₩ gross $12.00 dis 60 & 10 %
" Screw Gimlets .... dis 40 %
" Diamond Gimlets .... ₩ doz $1.10 dis 50&5 %
Double Cut Shepardson's .... dis 30 %
" Hartwell's .... dis 20&10 %
" Ives' .... dis 40 %
" Douglass' .... dis 40 %

Glue Pots.
Tinned and Enameled .... dis 30 %
Family, Bower's "Eureka" .... ₩ doz $3.60, dis 10 %
" L. F. & C's "Handy" .... dis 40 %

Grindstone Fixtures.
Humason & Beckley .... dis 25 %
Reading Hardware Co., new list .... dis 20&10 %
" Revolvers .... dis 20&10 %

Gun Wads.
C. M. C. B. E. 11 up $2.00
" 9 & 10 .... 2.20
" 7 & 8 .... 2.60
" P. E. 11 & up 3.00
" 9 & 10 .... 3.60
" 7 & 8 .... 4.00 dis 26 & 5 %

Halters.
Covert's Pat. Rope .... dis 33⅓ %
Horse and Cattle Ties, Covert's .... dis 33⅓ %

Hammers.
Maydole's .... dis 15 %
Coney's .... dis 25 %
E. Hammonds (new list July 10, '80) .... dis 25 %
Humason & Beckley .... dis 30 %
Verree .... dis 15 %
Magnetic Tack, Nos. 1, 2, 3, $1.25, 1.50 and 1.75 dis 20&10 %
Warner & Noble's .... dis 20 %
Kip's .... dis 20 %
Yerkes & Plumb .... dis 40 %

Hand Cuffs and Leg Irons.
Providence Tool Co.'s Hand Cuffs, $15.00 ₩ doz .... dis 10 %
" Leg Irons, $26 ₩ doz
Tower's .... dis 25 %

Handles.—Door or Thumb Latches—
Nos. 1 2 3 4
Per doz. .... $0.80 1.00 1.18 1.35 1.60 dis 55&10 %
Boggin's Latches .... per doz. $0@40c net
Bronzed Iron Drop Latches .... dis 60&10 %
Jap'd Store Door Handles—Nuts. $1.00 Plate $1.35
no Plate, $1.00 .... dis 10 %
Barn Door .... dis 60&10 %
Wrought Chest .... dis 60&10 %
Surface Chest, Sargent's list .... dis 60&10 %
Lifting .... dis 60&10 %
Saw and Plane .... dis 60&10 %
Boynton's Pat. Loop Saw Handles .... dis 25 %
" Centennial Saw Handles .... dis 25 %
Hammer and Hatchet .... dis 40 %
Brad Awl .... ₩ gross $1.00, dis 40&10 %
Hickory Firmer Chisel, assorted, ₩ gross $4.50
" large 5.00
" assorted 6.00
Apple .... " large 6.00
" assorted 3.00
Socket " large .... 5.00 dis 20&10 %
" Framing " 6.00
File, assorted, ₩ gross 2.75
Auger, assorted, ₩ gross 6.00
" large 7.00
Patent Auger, Ives' .... dis 25 %
" Douglass' .... ₩ set $1.25, net
" Swan's .... ₩ set $1, net

Hangers.
Barn Door, old patterns .... dis 50&10 %
" New England .... dis 50&10 %
Novelty .... dis 50&10 %
Challenge .... dis 40&10 %
Climax (Anti-Friction) .... dis 40&10 %
Sterling Improved (Anti-Friction) .... dis 40&10 %
Cheritree .... dis 40&10 %
Ridder's .... dis 40&10 %

Harness Snaps.
Henshaw's .... List of 1⅛ changed to 14.00, dis 50&10 %
Judd's .... " 14.00, dis 50 %
Fitch's (Bristol) .... " 12.00, dis 50&10 %
Great Western .... dis 50&10 %
Hotchkiss' .... dis 50&10 %
Andrews' .... dis 50&10 %
Sargent's .... dis 50&10 %
Sherman .... dis 50&10 %
Covert .... dis 40 %
Covered Spring .... dis 50&10 %

Hatchets.
Isaiah Blood.
Shingling, Nos. 1 2 3 .... ₩ doz $7.25 $8.00 $8.75
Claw, " .... ₩ doz 7.75 8.50 9.25
Lathing, " .... ₩ doz 6.00 6.75 dis 15 %
Hunt's .... dis 15 %
Shingling, Nos. 1 2 3 .... ₩ doz $7.25 $8.00 $8.75
Claw, " .... ₩ doz 7.74 8.50 9.25
Lathing, " .... ₩ doz 6.00 6.75
Hurd's .... dis 33⅓ %
Shingling, Nos. 1 2 3 .... ₩ doz $8.00 $8.50 $9.00
Claw, " .... ₩ doz 8.50 9.00 9.50
Lathing, " .... ₩ doz 7.50 8.00
Yerkes & Plumb .... dis 20 %
Shingling, Nos. 1 2 3 .... ₩ doz $7.25 $8.00 $8.75
Claw, " .... ₩ doz 8.25 8.75 9.25
Lathing .... ₩ doz 6.75 7.50
Simmons' .... dis 25 %
Shingling, Nos. 0 1 2 3 .... ₩ doz $7.50 $8.00 $8.50 $9.00
Claw, Nos. 1 2 3 .... ₩ doz 8.50 9.00 9.50
Lathing, Nos. 1 2 3 .... ₩ doz 8.00 8.50 9.00
Broad, Nos. 5 6 7 8 .... ₩ doz 15.00 16.00 18.00 20.00
Collins .... dis 25 %
Shingling, Nos. 1 2 3 .... ₩ doz $8.00 $8.50 $9.00
Claw " .... ₩ doz 8.50 9.00 9.50
Lathing, Nos. 1 2 3 .... ₩ doz 7.50 8.00 8.50

Hay Knives.
"Lightning" .... ₩ doz $20.00 net
Wadsworth's .... dis 33⅓ %

Hinges.
Gate, Western .... ₩ doz £0.25, dis 60 %
" N. E. .... ₩ doz $10.15, dis 60 %
" N. E. Reversible .... ₩ doz $8.50 dis 60 %
Gate, Clark's No. 1 .... ₩ doz $5.00 dis 50 %
" N. Y. State .... dis 60&10 %
" Automatic .... dis 60&10 %
" Common Sense .... dis 60&10 %
" Seymour's .... dis 60&10 %
" Shepard's .... Nos. 10, 20 & 30, dis 25 %
Rolled Blind Hinges .... dis 60&10 %
Rolled Plate .... dis 60&10 %
Rolled Raised .... dis 60&10 %
Wrought strap and T, list Dec. 20, '77 .... dis 60&10 %
Plate Hinges .... 8 to 10 in. $6.50 ₩ 100 ℔
" Providence, over 12 in. $6.00 ₩ 100 ℔
Screw Hook and .... 5, 6, 12 in. $6.75 ₩ 100 ℔
Strap .... 14 to 20 in. $6.25 ₩ 100 ℔
Heavy Welded Hook .... 5 to 12 in. $6.75 ₩ 100 ℔
" .... 14 in. & up, 6.50 ₩ 100 ℔
Screw Hook and Eye .... ⅜ in. 90; ½ in. 100; ⅝ in. 110; ¾ in. 120

Hoes.—Riveted Shank .... per doz. $6.00; dis 40 %
Socket .... ₩ doz $5.25, dis 30 %
Grub .... dis 30 %
Planters' .... dis 60&10 %
Scovill Pattern .... dis 60&10 %
Scovill Pattern, Handled .... dis 60&10 %
Heavy, Solid C. S. Planters' .... dis 20&10 @ 40 %
" " Scovill Pattern .... dis 20&10 @ 40 %
Winsted & Lane, Planters .... dis 20&10 %
" Scovill Pattern .... dis 20&10 %

Hooks.
Bird Cage, Sargent's list .... dis 60&10 %
Cotton .... dis 60&10 %
Cotton, Patented (N. Y. Mallet & Handle Wks), dis 25 %
Cotton (Humason & Beckley Mfg. Co.) .... dis 25 %
Cotton, new list Dec. 24, 1879 .... dis 60 %
Bench—Hotchkiss' .... $2.00 ₩ doz .... dis 25 %
" Weston's, No. 1, $10.00; No. 2, $9.00 ₩ doz dis 25 %
" McGill's .... ₩ doz $1.75 net
" Skinner's .... $2.25 per doz. dis 20 %
Clothes Line Sargent's list .... dis 60&10 %
" Reading list .... dis 60&10 %
Ceiling, Sargent's list .... dis 33⅓&5 %
" Reading list .... dis 33⅓&5 %
Coat and Hat, Sargent's list .... dis 60&10 %
" Reading .... dis 60&10 %
Harness Hooks, Brown's Pat. Solid Brass, $1 per gross .... dis 25 %
Tassel (T. & S. Mfg. Co.) .... dis 60&10 %
Wrought Staples and Hooks and Staples, dis 60&10&10 %
Wire Screw Hooks and Eyes, new list .... dis 60&10 %
Grass and Bush .... dis 40&10 %
Whiffletree Patent .... dis 60&10 %
Hooks and Eyes—Malleable Iron .... dis 60&10 %
" Brass .... dis 60&10 %

Horse Nails.
Nos. 5 6 7 8 9 10
Ausable—Finished, Polished, or Blued .... ₩ ℔ 300 270 250 240 230 220
A. C. 370 260 250 240 230
Putnam .... 30 26 24 22 20 dis 40 %
H. P. Pointed and Finished 30 26 24 22 20
National, Pointed 30 26 24 22 20 19 18

Horse Shoes.—Burden .... ₩ keg $4.37½
" Perkins' Improved Light, Medium and Heavy .... ₩ keg $4.37½

Ice Awls, Chisels, &c.
American Ice Chisel .... ₩ doz. $5.40 net
National .... ₩ doz $5.00 dis 20 %
Novelty Ice Breakers .... ₩ doz $3.00 dis 20 %
White's Sliding Head Picks .... ₩ doz $4.50 dis 20 %
Crane's King Picks .... ₩ doz $3.00 dis 20 %
Ice Awl and Picks, Sargent's .... dis 50&10 %
Iron .... ₩ doz $1.85 dis 50&10 %
Ice Mallets Pick in Head .... dis 50&10 %
" Pick in Handle .... dis 50&10 %
Ice Axes Small, Cast or Malleable .... ₩ doz 1.75 net
Kitchen Ice Tongs .... ₩ doz 2.25 net
Combination Ice Tools .... ₩ doz 5.00 net

Kettles.
Brass, 7 to 13 inches inclusive .... ₩ ℔ 30c net
Larger than 13 inches .... ₩ ℔ 30c net
Enameled .... dis 30 %

Knives.
Ames' Butcher Knives .... dis 25 %
" Shoe .... ₩ doz $1.00, dis 25 %
" Bread .... dis 25 %
Moran's Shoe and Bread Knives .... dis 25 %
Hay and Straw—Wadsworth's .... dis 30 %
Table and Pocket .... See Cutlery

Knobs.
Carriage (Jap'd $00 ₩ gross) .... dis 20&10 %
Base—Common .... dis 60&10 %
Rensalus Door Knobs .... dis 60&10 %
Door, Mineral .... dis 60&10 %
" Por Jap'd .... Same discounts as Door Locks.
" Por ....
Furniture .... dis 60&10 %
" Plain .... 750 gross lots, dis 60&10 %
" Wood Screws .... dis 60&10 %
Picture (T. & S. Mfg. Co.) .... dis 60&10 %
" Sargent's .... dis 60&10 %
Bemaslie Picture .... dis 60&10 %
Shutter, Porcelain .... dis 60&10 %

Ladles.
Melting—Sargent's .... dis 50&10 %
" Reading .... dis 50&10 %
" Monroe's Patent .... ₩ doz $4.00, dis 10 %

Lanterns.
Tubular .... No. 0, $8.60; No. 1, $10.15 net
" With Guards 50c extra
Hurricane No. 2 .... ₩ doz $5.75, net
Peerless .... No. 5, ₩ doz $11.75, dis 10 %
Brady's Patent .... dis 10&10 %
Ætna .... dis 10&10 %
Yankee .... dis 10&10 %
De Bouque .... dis 10&10 %
Police .... small, $7.00; Med., $8.25; Large, $12.00, dis 10 %
Convex Reflector .... $2.75 ₩ doz, dis 10 %

Lemon Squeezers.
Porcelain Lined .... ₩ doz $6.00—dis 30 %
Wood .... ₩ doz 3.00—dis 30 %
Dunlap's Improved .... ₩ doz $4.00 net
Sammis' .... No. 1, $7.00; No. 2, $12.00 ₩ doz, dis 25 %
Townsend's Patent .... $6.00 ₩ doz, dis 25 %

Lines.—Linen Fish .... dis 20&10 %
Cotton Chalk .... dis 25 %
Sil. Lake Chalk .... Nos. 0, 1, 2, 3, $6.00, $6.50, $7.00, $7.50
Mason's Linen .... dis 25 %
Wire Clothes, Galvanized .... each 25 @ 50c net

Locks and Latches.
Cabinet—Eagle .... Changes made in list price of some numbers July 1, 1880, and also July 15, dis 40 %
" Gaylord
" Bridgeport
" A. E. Deitz .... dis 40 %
Trunk .... net
Langstroth & Crane's List Jan. 1 '77.
Round Key, No. 1 to 4 ....
" No. 1⅛ to 12 .... ₩ ℔ 0.00 net
Flat Key .... dis 33⅓&10 %
A. E. Deitz, Flat Key .... dis 40 %
Yale Lock Co., Flat Key .... dis 40 %
"Shepardson" or "U. S." .... dis 40 %
"Felter" or "American" .... dis 40 %
Plate .... dis 40 %
P. Many's Extension Cylinder .... $12.50 ₩ doz. net
DOOR LOCKS, &C
Branford
Norwalk
Norwich
P. & F. Corbin
Russell & Erwin
Mallory, Wheeler & Co
Reading Hardware Co
Trenton Lock Co
— New list June 10, 1880, dis 50&5 % cash
Padlocks—Russell & Erwin
" Mallory, Wheeler & Co .... and 2 % off cash
" Wm. Wilcox & Co .... dis 40 %
" Yale Lock Mfg. Co.'s "Standard" .... dis 40 %
" Romer's .... dis 40 %
" Conestoga .... dis 40 %
" J. H. McWilliams .... dis 40 %
" A. E. Deitz .... dis 40 %

Mallets.—Hickory .... dis 20&10 %
" Lignumvitæ .... dis 20&10 %
Penfield Block Works, Lig., Apple & Hickory .... dis 40 %

Meat Cutters.
Dixon's (P. S. & W.) Nos. 1 2 3 4
₩ doz. $15.00 17.00 19.00 30.00—dis 35 %
Miles' Challenge .... Nos. 1 2 3
₩ doz. $22.00 30.00 42.00—dis 35 %
Perry's .... Nos. 1 2 3 4 5
Each .... $4.00 6.00 10.00 15.00 18.00—dis 30 %
Woodruff's (P. S. & W.) .... Nos. 1 2 3 dis 30 %
₩ doz. $11.00 13.00 dis 35 %
Hale's .... Nos. 11 12 13
₩ doz. $27.00 33.00 45.00—dis 40&10 %
Draw Cut .... Nos. 1 2 3 4 5
Each .... $4.00 7.00 8.00 10.00 13.50—dis 25 %
American .... dis 25 %
Nos. 1 2 3 4
Each .... $3.00 7.00 10.00 21.00, ₩ doz, dis 40 %
Kleiser's No. 15 .... dis 40 %
" Gem .... $25 per doz, dis 40 %
Silver & Deming .... dis 40 %
Pennsylvania .... dis 40 %
Nos. 1 2 3 4
₩ doz .... $17.00 26.00 33.00 43.00 dis 40 %
Beef Shavers (Enterprise Mfg Co.) .... dis 25 %

Mincing Knives.
Am. (2d quality) per gross, 1 blade, $7; 2 blades, $13; 3 blades, $18
Lathrop's .... dis 20&10 %
Smith's .... per doz $1.15 dis 25 %
Cowles Hdw. Co .... dis 25 %

Molasses Gates.
Stebbins Pattern .... dis 60&10 %
" Genuine .... dis 37½&10 %
" Tinned Ends .... dis 60 %
Chase's Hand Metal .... dis 60 %
Bush's .... dis 60 %
Lincoln's Pattern .... dis 60 %
Weed's .... dis 15 %
Boss, No. 1 2 3 4
$7.00 $8.00 $9.00 $10.00 per doz.
" Japanned Finish .... dis 50 %
" Bronze .... dis 40 %

Nails.
Nuts and Washers.
Nails .... See Trade Report
Square Nuts .... 70 off list
Hexagon Nuts .... 70 off list
Washers .... ₩ ℔ 5c net

Nut Crackers.
Table (Humason & Beckley Mfg. Co.) .... dis 33⅓ %
Blake's Pattern .... dis 33⅓ %
Turner & Seymour Mfg. Co .... dis 40 %

Oakum.
Best .... ₩ ℔ 11c
U. S. Navy .... ₩ ℔ 10c
Navy .... ₩ ℔ 9c

Oilers.—Zinc and Tin .... dis 50 %
Brass and Copper .... dis 40 %
Malleable (Hammer's) .... dis 40 %
Prior's Patent or "Paragon" Zinc .... dis 50 %
" Brass .... dis 50 %
Olmstead's, Tin and Zinc .... dis 50 %
" Brass and Copper .... dis 50 %
Broughton's, Zinc .... dis 50 %
" Brass .... dis 50 %

Ox Balls.
Pencils.
Faber's Carpenters' .... High list, dis 40&10 %
" Round Gilt .... ₩ gross $2.25 net
Dixon's Lead .... ₩ gross 4.50 net
" Lumber .... ₩ gross
Dixon's Carpenters' .... dis 25 %

Packing, Steam.
N. Y. Belting and Packing Co .... new list net

Picture Nails.
Brass Head, Sargent's List .... dis 50 %
" T. & S. Mfg. Co .... dis 50 %
Porcelain Head, Sargent's List .... dis 50 %
" Judd's List .... dis 50 %
Porcelain Head .... T. & S. Mfg. Co .... dis 50 %
Niles' Patent .... dis 50 %

Pinking Irons. .... ₩ doz 75c net

Plaiting Machines.
Magic .... ₩ doz $10.00, net
Astor Plaiting Machines .... each $11.00, dis 25 %
Crown Plaiting Machines .... dis 25 %
" 6in., $8.00, 10in., $10.00 each net

Planes and Plane Irons.
Bench, First Quality .... dis 25 %
" Second .... dis 30 %
Moulding .... dis 25 %
Bailey's (Stanley R. & L. Co.) new list Jan. 1880 dis 25 %
The Stanley (S. R. & L. Co.) .... dis 25 %
Bailey's "Victor" .... dis 25 %
Defiance Adjustable .... dis 25 %
Plane Irons, Butcher's .... dis 20 %
" Buck Bros .... dis 20 %
" Auburn Tool Co.'s .... dis 20 %
" The Globe Mfg. Co. "Baldwin Iron" .... dis 20 %
" Ohio Tool Co .... dis 20 %
" Sandusky Tool Co .... dis 20 %

Pliers and Nippers.
Button's Patent .... dis 33⅓ %
Hall's Pat. Compound Lever Cutting Nippers No. 2; 9 in., $20; No. 4, 7 in., $20 ₩ doz dis 30 %
Humason & Beckley Mfg. Co .... dis 30 %
Gas Pliers .... dis 40 %
Eureka Pliers and Nippers .... dis 40 %
Russell's Parallel .... dis 40 %
R. B. & W. Cast Steel .... dis 40 %
" Tinners' Cutting Nippers .... dis 40 %

Plumbs and Levels.
Disston's .... dis 40 %
Stanley R. & L. Co.'s Pat. Adjustable .... dis 25 %
" Non-Adjustable .... dis 25 %
Chapin's Patent Adjustable .... dis 25 %
" Non-Adjustable .... dis 25 %
Standard Rule Co.'s New Adjustable .... dis 25 %
" Non-Adjustable .... dis 25 %
Johnson's Patent Adjustable .... dis 25 %
Pocket Levels .... dis 25 %
Davis' Inclinometers .... dis 25 %

Post Hole and Tree Augers.
Samson Post Hole Digger .... per doz $37.50, dis 25 %
Fletcher Post Hole Augers .... ₩ doz. 36.00, dis 25 %
Vaughan's Post Hole .... dis 25 %
6 in. $25.00; 7 & 8 in. $27.00; 9 in. $28.00 .... dis 25 %
Eureka Diggers ₩ doz .... dis 25 %

Pruning Hooks and Shears.
Disston's Combined Pruning Hook and Saw per doz $33.00, dis 20 %
" Pruning Hook .... 12.50, dis 20 %
E. S. Lee & Co.'s Pruning .... dis 25 %
Pruning Shears .... ₩ doz $4.50 dis 25 %

Pulleys.
Hot House and Tackle .... dis 60&10 %
Jap'd Screw .... dis 60&10 %
" Brass Screw .... dis 60&10 %
Jap'd Side .... dis 60&10 %
" Clothes Line .... dis 60&10 %
Hay Fork Solid Eye, $4.50; Swivel, $5.00, dis 40 %
" Anti-Friction .... dis 25 %
" "S" Common and Pat. Bushed .... dis 25 %
" Tarbox Pat. Iron .... dis 25 %
Shade Rack .... dis 50 %

Punches.
Belt or Drive .... ₩ doz. $2.00 dis 25 %
Bemis & Call Co.'s Cast Steel Drive .... dis 25 %
" Spring Socket .... dis 25 %
Spring .... dis 25 %
Tinners' .... dis 25 %
Bemis & Call Co.'s Spring and Check .... dis 25 %
Solid, Tinners' .... dis 25 %

Rail. Sliding Door Wrought Brass......₩ ℔ dis dis 20 %
" " Iron, Painted . ₩ foot 10c. dis 60&10
Barn Door....Inch..... ¾ ⅝ ⅝
Per 100 feet. $2.00 3.60 5.60—dis 10 %
" for N. E. Hangers—
Small. Med. Large.
Per 100 feet ......$2.10 2.70 3.30—net

Razors.
J. R. Torrey Razor Co...........dis 10 @ 20

Razor Straps.
Genuine Emerson.........dis 40 @ 50 %
Badger's Emerson..........dis 40
Badger's (not Emerson).........dis 25 %
Evans'.........dis 40 %
Imitation Emerson.......₩ doz $2.00. dis 20 %
Hunt's.........dis 40&5 %
Chapman.........dis 15 @ 20 %
Saunders'.........dis 10 %
Torrey's.........dis 20 %

Rivets.
Iron and Tinned.........dis 50 %
In bulk, list of May 21.........dis 30 %
Copper Rivets and Burs.........dis 35 %
Nos.– 8 9 10 11 12 13 14 15
₩ ℔..40c 40c 40c 45c 50c 60c 70c
Tinned Iron Belt Rivets and Burs.........dis 30 %

Rivet Sets..........40 %

Rods.
Stair.........New , March 1 '79, 10'
" American Patent.........dis 20 %

Rollers.
Barn Door, Sargent's list.........dis 55&10 %
Novelty.........dis 10 %
Acme (Anti-Friction).........dis 50 %

Rope. Manufacturers' Net List. Sept. 20, 1880
Manila.........¾ inch and larger ₩ ℔ 13 c
" ....⅝ inch ₩ ℔ 13½c
" ....¼ and 5-16 inch ₩ ℔ 14 c
" Tar'd Rope.........₩ ℔ 12½c
" Lath Yarn.........₩ ℔ 12½c
" Hay Rope.........₩ ℔ 13 c
Sisal.........¾ inch and larger ₩ ℔ 11½c
" ....⅝ inch ₩ ℔ 11 c
" ....¼ and 5-16 inch ₩ ℔ 11½c
" Hay Rope.........₩ ℔ 10½c

Rules.
Boxwood. Ivory
Chapin's.........
Standard......... } dis 6 &10 % } dis 50&10 %
Stanley.........
Stephens.........

Sad Irons.
" From 4 to 10 lbs.........₩ ℔ 3⅞c net
Self Heating.........₩ doz $10.50 net
" Tailors'.........₩ doz $18.00 net
Gleason's Shield and Toilet.........dis 25 %
Enterprise Patent Cold Handle.........dis 30 %
Mrs. Potts's Pat. Cold Handle, "Crown".........dis 30 %
Combined Fluter and Sad Iron...per doz $11.00, dis 15 %

Sand Paper.
Baeder & Adamson's Flint, 00 to 1½...$4.75 ₩ ream
" " 2, 2½ & 3...5.25 ₩ ream
" Assorted 4.75 ₩ ream } dis 20 @ 25 %
Star.........5.75 ₩ ream
Emery...₩ ream $6.50 @ 11.50
New England, same list as B. & A. Flint.....dis 20 @ 25 %
Gage's.........dis 20&5 %

Sash Cord.
Common.........₩ ℔ 13 @ 20c net
Patent.........₩ ℔ 19c net
Silver Lake Russia Flax.........₩ ℔ 5c. dis 10 %
" White Cotton.........₩ ℔ 60c. dis 10 %
" Drab Cotton.........₩ ℔ 65c. dis 10 %
Raw Hide.........dis 25 %
Steel Ribbon.........dis 10 %

Sash Locks.
Clark's, No. 1, $10.00; No. 2, $8.00 per gross.....dis 33⅓ %
Ferguson's.........dis 33⅓ %
Walker's.........net
Hammond's Window Springs.........dis 25 %
Northup Window Springs.........$4.00 per gross, dis 10 %
The Perfect, Clark & Smith, Plain Jap'd ₩ gro $10.00 net
" " " per Knob Jap'd ₩ gro 14.00 net
" " " Nickel-Plated...₩ gro 27.00 net

Sash Weights.—Solid Eyes, in 500 ℔ lots
and over.........₩ ℔ 1⅜c net

Sausage Stuffers or Fillers.
Miles.........₩ doz $20, dis 30 %
Perry.........₩ doz, No. 11: No. 0, $21, dis 35 %
Praw Cut No.........each $30.00, dis 20 %
Enterprise Mfg. Co.........dis 20 %
Silver's.........dis 25 %

Saws.
Disston's Circular.........dis 35 %
" Mill.........dis 35 %
" Cross Cut.........dis 25 %
" Hand, Panel, Rip, &c.........dis 20 %
Boynton's Lightning Cross Cuts, new list.........dis 20 %
" One-Man, all lengths.........dis 20 %
" Billet Webs, 30 in.........dis 25 %
" Lightning Buck Saws X Par.........dis 25 %
" Lightning Hand, Panel and Rip.........dis 25 %
Wheeler & Clemson Mfg. Co.'s Hand.........dis 20 %
W. M. & C. Mfg. Co. Cross-Cuts, except Monarch, dis 20 %
Livingston's Butcher and Kitchen.........dis 20 %
" Framed Wood—
Nos. 101 102 103 104 105
Per doz..$10.00 8.50 10.00 7.00 6.25 net

Saw Frames.
White, Vermont.........₩ doz $1.35, dis 25 %
Red, Polished and Varnished.........₩ doz $2.00, dis 25 %
Saw Rods.........$10 list dis, 10&10 %

Saw Sets.
Boynton's Patent X Cut, per doz. $12.00; Hand Saw,
per doz. $10.00.........dis 20 %
Stillman's Genuine.........₩ doz $3.50 @ $4.50 dis 10 %
" Imitation.........₩ doz $2.25. dis 30&10 %
Common Lever.........per doz $2.00. dis 30&10 %
Leach's.........No. 0, $8.00; No. 1, $11.00. dis 15 %
Nash's.........No. 1, $8.00; No. 2, $4.00. dis 20 %
Hammer, Hotchkiss.........$5.50. dis 10 %
" Bemis & Call Co.'s New Pat.........dis 40&5 %
Bemis & Call Co.'s Lever & Spring hammer...dis 30&5 %
" " Plate.........dis 10 %
" " Cross Cut.........dis 12½ %
Aiken's Genuine.........$13.00. dis 6 &10 %
" Imitation.........$7.00. dis 50 %
Hart's Patent Lever.........dis 20 %
Disston's.........dis 20 %

Scales.
Hatch, Counter, No. 171.........₩ doz $36. dis 35&10 %
" Tea, No. 161.........₩ doz $21.00 dis 40&10 %
Union Platform.........dis 45 %
Fairbanks'.........dis 20 %
Buffalo Scale Co.........dis 20&5 %
Howe's.........dis 20&5 %
Chatillon's Grocers'.........dis 40 %
" Eureka.........dis 25 %
Family Universal.........dis 50 %
" Favorite.........dis 30 %
" Turnbull's.........dis 20 %
Scale Beams, Chatillon's list.........dis 10 %
" Sargent's list.........dis 40&10 %

Scrapers.
Adjustable Box Scraper (S. R. & L. Co.), $6.00 dis 20&10 %
Box, 1 Handle.........₩ doz $4.00, dis 10 %
" 2 " ....₩ doz 6.00 dis 10 %
Defiance Box and Ship.........dis 20&10 %
Foot.........dis 20&10 %
Ship (common).........per doz $3.00 net
" Providence Tool Co.........dis 10 %

Screw Drivers.
Douglass Mfg. Co.........dis 20&10&10 %
Disston's.........dis 50 %
Disston's Patent Excelsior.........dis 50 %
Buck Bros.........dis 25 %
Stanley Rule & Level Co., Varnished Hdls...dis 50&10 %
" " Black Handles...dis 40&10 %
Sargent & Co.'s.........dis 50&10 %
Gay's Double Action Ratchet
per doz., 4 in., $9.00; 5 in., $10.50; 6 in., $12.00 dis 30 %
Cowles Hdw. Co., No. 1 Extra.........dis 40&10 %
" " No. 1.........dis 40 %
" " Nos. 2 and 00.........dis 30 %

Screws.
Flat Head Iron.........dis 45 %
Round Head Iron.........dis 40 %
Flat Head Brass.........dis 45 %
Round Head Brass.........dis 30 %
Brass and Silver Capped.........dis 40 %
Japanned, list of Plain Screws.........dis 30&10 %
Coach Patent Gimlet Point, List per 100....dis 50@55 %
Bed.........dis 10 %
Machine, Flat Head, Iron, Am. Screw Co.....dis 60 %
" Round Head, Iron. " ....dis 55 %
Bench, Iron.........dis 55 %
" Wood, Beech.........₩ doz $3.00, dis 10 %
" " Hickory.........dis 20&10 %
Hand.........dis 25&10 %
Hand Rail, Sargent's.........dis 20&10&10 %
" Humason, Beckley & Co's.........dis 50 %
" Am. Screw Co.........dis 35 %
Jack (Wilson's).........dis 20 %

Screw Window Balances.
R. B. Huguin's.........$36.00 per gross, dis 25 %

Scroll Saws.
Lester, $10.00.........dis 20 %
Rogers, $5.50.........dis 25 %

Shears and Scissors.
American (Cast) Iron.........dis 60&10 %
Clipper Cast Iron.........dis 70&10
Pruning.........see Pruning Hooks and Shears.
Barnard's Lamp Trimmers.........₩ doz $3.75
Tinners'.........dis 15 %
Seymour's, List, Nov. 25, 1879.........dis 60 %
Heinsch's " " ....dis 60 %
" Tailors' Shears.........dis 33⅓ %
Mass. Cutlery Co. St. Trimmers.........dis 75 %

Sheaves.
Sliding Door, M. W. & Co., list.........dis 55&2 %
" R. & E. list.........dis 60&1 &2 %
" Patent Roller.........dis 10 %
" " " Hatfield's ...dis 60&10&2 %
" Russell's Anti-Friction ....dis 60&10&2 %
" Moore's Anti-Friction.........dis 40 %
Sliding Shutter, R. & E. list.........dis 60&10 &2 %
" " Sargent's list.........dis 55&10 %
Moore's Anti-Friction (Hanging).........dis 40 %

Shovels and Spades.
Ames. New list. Jan. 26. 1880.........dis 10 %
Hussey Binns & Co., Patent.........dis 15 %
" " Association List.........dis 5 %
Old Colony (changes in list Oct. 15, '79).........dis 15 %
Remington's (Lowman's Patent).........dis 25 %
Rowland's.........dis 40 %
Griffiths.........dis 40&10 %

Shovels and Tongs.
Iron and Brass Head, R. & E. list.........dis 40&10&2 %
Polished Steel.........new list. dis 40&10&2 %

Slates.
Square Framed.........by case.....dis 70 %
Less than a case.........dis 65&10 %

Spoke Shaves.
Defiance Metallic.........dis 20&10 %
Iron.........dis 45 %
Wood.........dis 30 %
Bailey's (Stanley R & L. Co.) new list.....dis 20&10 %
Stearns'.........dis 10&10 %

Spoke Trimmers.
Bonney's.........₩ doz $10.00 dis 40&5 %
Stearn's.........₩ doz $10.00, dis 40 %
Ives'.......No. 1, $15.00; No. 2, $12.00 ₩ doz, dis 50&10 %
Douglass'.........₩ doz $9.00, dis 15 %

Spoons.
Basting.........dis 15 %
Riveted Table and Tea.........dis 55 %
Solid Table and Tea.........dis 55 %
Britannia.........dis 60 %
The Wm. Rogers Mfg. Co.........dis 33⅓&5 %
Reed & Barton.........dis 33⅓&5 %
Hall & Elton.........dis 33⅓&5 %
Holmes, Booth & Haydens.........dis 33⅓&5 %
German Silver.........dis 25&10 %
Cast Steel, Sil. Plated.........dis 33⅓ %
Tin (P. S. & W.), Teas.........$1.25 ₩ gross, net
" Tables.........$2.00 ₩ gross, net
Tin Cowles Hdw. Co.).........dis 10 %
" " " case lots.........dis 20 %

Stocks and Dies.........dis 5&10 %
"Lightning" Screw Plate.........dis. 10 %

Stone.
Hindostan Hacker Stone.........₩ gross $12.00 dis 10 %
Sand Stone.........₩ ℔ 6c. dis 33⅓&10 %
Washita Stone.........No 1. ₩ ℔ 18c net
" ....No 2. ₩ ℔ 15c net
" Slips.........No. 1. ₩ ℔ 36c net
Washita Stone (Boyd & Chase)..... No. 1 ₩ ℔ 15c net
" " Slips (Boyd & Chase).........30c net
" " mo'ted (Boyd & Chase) 6, 7 & 8 in, dis 30 %
" " No. 2.........₩ ℔, 13c. net
Arkansas Stone No. 1, 4 to 6 in.........℔ ₩ $1.35 net.
" " No 1, 6 to 9 in.........℔ ₩ $2.00 net
Turkey Oil Stone (Boyd & Chase)....4 to 8in, $1.00 ₩ ℔,
dis 10 %
" Slips ....$2.50 ₩ ℔, dis 10 %
Lake Superior (Boyd & Chase).......₩ ℔ 20c, dis 10&5 %
" " Slips " ....₩ ℔ 45c, dis 10&5 %
Grindstones. Family, Loring's.........dis 10 %

Stove Polish.
Joseph Dixon's.........₩ gross $5.75 net
Gem.........₩ gross $4.50, dis 10 %
Gold Medal.........₩ gross $6.00, dis 25 %
"Mirror".........₩ gross $6.00, dis 5 %
Ruby.........₩ gross $3.75, net
Rising Sun.........₩ gross $5.75, net
Dixon's Plumbago.........₩ ℔ 8c. net

Squares.
Steel.........dis 50 %; full cases, dis 50&10 % }
Iron.........dis 50 %; full cases, dis 50&10 % } 2 % cash
Nickel Plated.........add $2.50 @ $4.00 ₩ doz, net }
Try Squares and T Bevels.........dis 45&10 %
Disston's Try Squares and T Bevels.........dis 52½ %
Winterbottom's Try and Mitre.........dis 20&10 %

Tacks, Brads, &c.
List of April 2, 1880
Tinned Swedes Tacks.........dis 35 %
Tinned American " ....dis 45 %
Swedes Tacks, all kinds.........dis 20 %
Copper Tacks and Nails.........dis 25 %
Swedes Hungarian Nails.........dis 20 %
American " " ....dis 20 %
Gimp and Lace Tacks.........dis 10 %
Finishing Nails.........dis 15 %
Trunk and Clout Nails.........dis 15 %
Common and Patent Brads.........dis 10 %
Basket Nails.........dis 15 %
Brush Tacks.........dis 10 %
Leathered Carpet Tacks.........dis 20 %
American Cut Tacks.........dis 20 %
Cigar Box Nails.........dis 20 %
Chair Nails.........dis 25 %
All other Tack List goods.........dis 20 %
(Extra 10 % on all.)
Double-Pointed Tacks.........dis 40&5 %

Tap Borers.
Common and Ring.........dis 15 %
Ives' Tap Borers.........dis 15&10 %
Enterprise Mfg. Co.........dis 20 %

Tapes, Measuring.
American.........dis 20 %
Spring Tapes.........dis 25&10 %

Thermometers.
Tin Case.........dis 65&10 %

Tobacco Cutters.
Enterprise Mfg. Co. (Champion).........dis 20 %
Wood Bottom.........₩ doz $12.00, dis 40&5 %
All Iron.........₩ doz $9.50, dis 40&5 %
Nashua Lock Co.'s.........₩ doz $12.00, dis 50@55 %

Toe Calks.—Winsted.........₩ ℔ 9c. dis 5

Tinners' Tools and Machines.
Machines (P. S. & W.).........list add 20 %
Tools (P. S. & W.).........add 6 %

Transom Lifters.
Wollensak's Patent.........dis 35 %

Traps.
Game. Newhouse.........dis 30 %
" Newhouse Pattern.........dis 50 @ 55 %
" Blake's Patent.........dis 40 %
Mouse, Wood, Choker.........₩ doz holes, 16½c
" Round Wire.........₩ doz $1.50, dis 10 %
" Cage " ....₩ doz $2.50, dis 10 %
" Catch-em-alive.........₩ doz $2.50, dis 10 %
Rat. "Decoy".........per doz $10.00, dis 10 %

Trowels.
Lothrops Brick and Plastering.........dis 20 %
Reed's Brick and Plastering.........dis 15 %
Disston's Brick and Plastering.........dis 20 %
Peace's Plastering.........dis 30 %
Clement & Maynard's.........dis 20 %
Rose's Brick.........dis 15 %
Brades' Brick.........dis 20 %
Worrall's Brick and Plastering.........dis 20 %
Garden.........dis 45 %

Triers.
Butter and Cheese.........dis 25%

Vises.
Solid Box.........List. of July 1, '79 dis 25 %
" "Crown" (A. H. Hildick) 40 to 100 ℔, 15c net
" Peter Wrights.........15½c
Parallel, Parker's.........dis 10 %
" Wilson's.........dis 40 %
" Howard's.........dis 20&10 %
" Merrill's.........dis 15 %
" Sargent's.........dis 55&10 %
" Trenton.........dis 30 %
" Backus and Union.........dis 40 %
" Oval Slide.........dis 40 %
" Fisher & Norris.........dis 15&10 %
" Prentiss.........dis 25 %
" Stevens'.........dis 20 %
" Simpson's Adjustable.........dis 25 %
"Family." List.........net
Saw Filers, Bonney's.........₩ doz $24.00, dis 20&10 %
" Stearn's.........dis 20&10 %
Hopkins'.........₩ doz $17.50 dis 10 %
Lowell Hand Vises.........dis 20 %
Richardson's Vise and Anvil.........dis 25 %

Washer Cutters.
Smith's Patent.........₩ doz $12.00 dis 25 %
Johnson's.........₩ doz $12.00. dis 33⅓ %
Penny's.........₩ doz $14.00 and $16.00. dis 45 %
Appleton's.........₩ doz $16.00, dis 60&10 %

Washers.—See Nuts and Washers.

Well Wheels.—Revised list.........dis 60&10%

Wire.
Brass and Copper...... List of June 10. 1880....dis 20 %
Bright and Annealed.........Nos. 0 @ 18. dis 45 @ 50 %
" " ....Nos. 19 @ 26, dis 52½ @ 57½ %
" ....Nos. 27 @ 36. dis 60 @ 65 %
Coppered.........Nos. 0 @ 18. dis 40 @ 45 %
Galvanized, Nos. 0 to 6.........₩ ℔ 10c. dis 35 @ 37½ %
" Nos. 7 to 18......market list. dis 35 @ 37½ %
Tinned, Nos. 0 to 18.........dis 37½ @ 42½ %
Cast Steel.........dis 25 @ 30 %
Tinned Broom Wire, Nos. 18 to 25.........dis 47½ @ 50 %
Annealed Fence, Nos. 8 and 9.........dis 45 @ 50 %
" Grape, Nos. 10 to 14.........dis 45 @ 47½ %
Galvanized Telegraph, Nos. 7 to 9.........₩ ℔ 9c
" " Nos. 10 and 11.........₩ ℔ 10c
" No. 12.........₩ ℔ 10½c
Fence Staples.........₩ ℔ 7¼ @ 7½c
" Staples, Galvanized.........₩ ℔ 8¼ @ 8½c
Stubs Steel Wire.........$7.00 to £
Japanned Barb Fence.........₩ ℔ 9c
Galvanized " ....₩ ℔ 10c
Steel Music Wire, Nos. 12 to 27.........₩ ℔ $1.25. net
Turner & Seymour Mfg. Co., Picture Wire..dis 80&20 %
Judd's Picture Wire.........dis 80&20 %
Clothes Line Wire, Galvanized.........₩ coil 30@40c net
Wire Cloth, green and drab.........₩ sq. ft. 3⅛ c net

Wrenches.
American Adjustable.........dis 45 %
Baxter's Adjustable "S,".........list Jan., 1880. dis 20 %
" Diagonal.........dis 20 %
Coes 'Genuine.........dis 50 %
" "Mechanics".........dis 50&10 %
" Pattern, Malleable.........dis 70 %
Girard Standard.........dis 50&10 %
Girard Agl.........60&10 %
Bemis & Call's Patent Combination.........dis 20 %
" " Merrick's Pattern.........dis 35 %
" " Briggs' Pattern.........dis 25 %
" " Cylinder or Gas Pipe.........dis 40 %
Van Wagoner & Williams' Basin.........per doz $4.50
Aiken Pocket (Bright).........$6.00. dis 60&10 %
The Favorite Pocket (Bright).........per doz $8, dis 60 %
Webster's Pat. Combination.........dis 35 %

Wringers. Per doz.
Universal, XX No. 2½.........$60.00
" " No. 2.........63.00
" " No. 1½.........71.00
" " No. 1.........93.00
" " No. 8.........each 12.00
" " No. 12......... " 20.00
" No. 18......... " 25.00
" " No. 22......... " 32.00
Peerless, No. 0, no Cogs.........51.00
" No. 1, " 54.00
" No. 2½, with Cogs.........60.00
" No. 2, " 63.00
" No. 3, " 71.00
" No. 4, " 89.00
Unique, No. 0.........57.00
" No. 1.........64.00
Eureka, No. 1.........54.00
Novelty, No. 10, with Cog Wheels.........60.00
" No. 2, " 69.00
Excelsior, No. A, with Folding Bench.........75.00
" No. E, for Set Tubs.........[illegible]

NEW YORK WHOLESALE PRICES, November 24, 1880.

METALS.

IRON.—DUTY: Bars, 1 to 1½c. ℔ ℔; Sheet, Band Hoop and Scroll, 1½ to 1¾c. ℔ ℔; provided, that none of the above iron shall pay a less rate of duty than 35 per cent. Pig, $7 ℔ ton; Polished Sheet, 3c. ℔ ℔; Wrought Scrap, $8 ℔ ton: Cast Scrap, $6 per ton. Railroad 70c. ℔ 100 ℔s. Boiler and Plate, 1¼c. ℔ ℔.

Iron—AMERICAN

Foundry No. 1	℔ ton	$25.00 @ 26.00
" No. 2X	℔ ton	21.00
Gray Forge	℔ ton	20.00

SCOTCH.

Eglinton	℔ ton	21.50 @ 22.00
Carnbroe	℔ ton	23.00 @ 24.00
Coltness	℔ ton	24.50 @ 25.00
Glengarnock	℔ ton	23.00 @ 24.00
Gartsherrie	℔ ton	23.50

Rails.

Iron	℔ ton	$46.00 @ 49.00
Steel	℔ ton	59.00 @ 63.00
Old Rails	℔ ton	27.00 @ 28.00

Scrap.

Wrought Scrap ℔ ton .... 27.00 @ 28.00

Bar Iron, from Store.—

Common Iron:
¾ to 2 in. round and square .... } ℔ ℔ 2.2c
1 to 6 in. x ⅜ to 1 in. .... }
Refined Iron
¾ to 2 in. round and square .... } ℔ ℔ 2.4c
1 to 6 in. x ⅜ to 1 in. .... }
1 to 6 in. x ¼ and 5-16 .... ℔ ℔ 2.6c
Rods—⅝ and 11-16 round and square .... ℔ ℔ 3.2c
Bands—1 to 6 x 3-16 to No. 12 .... ℔ ℔ 3.2c
Norway Nail Rods .... 7 c

Sheet Iron.

	Common American	R. G. American.
Nos. 10 to 20	℔ ℔ 4c	5
21 to 24	℔ ℔ 4¼	5
25 to 26	℔ ℔ 4½c	5¼
27	℔ ℔ 4¾c	5½
28	℔ ℔ 4¾c	5¾

	B. B.	2d qual.
Galvanized, 10 to 20	℔ ℔ 8c	7c
21 to 24	℔ ℔ 9c	8c
25 to 26	℔ ℔ 9½c	8½c
27	℔ ℔ 10½c	9c
28	℔ ℔ 11c	9½c
Patent Planished	℔ ℔ 13c; B, 10½c	
Russia		13 c
American Cold Rolled		℔ ℔ 5 @ 7½c

COPPER.—DUTY: Pig, Bar and Ingot, 4c; Old Copper, 4c ℔ ℔. Manufactured (including all articles of which Copper is a component of chief value), 45 % ad valorem.

American Ingot .... ℔ ℔ See Trade Report.

SHEATHING, BRAZIERS' COPPER, BOLTS, &c.

Braziers' Copper, ordinary sizes, 16oz. per sq. ft., and over per ℔ 28c
Braziers' Copper, ordinary sizes, under 16 oz. and over 12 oz. ℔ sq. ft. .... ℔ ℔ 30c
Braziers' Copper 10 oz. and 12 oz., ℔ sq. ft. .... ℔ ℔ 32c
" " Lighter than 10 oz. ℔ sq. ft. .... ℔ ℔ 34c
Circles less than 84 in. diameter .... ℔ ℔ 31c
Circles 84 in. diameter and over .... ℔ ℔ 34c
Segment and Pattern Sheets .... ℔ ℔ 31c
Locomotive Fire Box Sheets .... ℔ ℔ 28c
Sheathing Copper, over 12 oz. ℔ sq. ft. .... ℔ ℔ 26c
Bolt Copper .... ℔ ℔ 28c
Copper Bottoms .... ℔ ℔ 31c

No Copper is Sheathing except 14x48 inches and not to exceed 34 oz. to the sq. ft.

TINNING.

14x48 .... ℔ sheet 60
All other size Sheets, 2½c. per square foot.
For tinning both sides, double the above amount.

O'NEILL'S PATENT PLANISHED COPPER.—Net.

14x48.
4 and 16 oz. and heavier .... ℔ ℔ 36c By the case ℔ ℔ 35c
12 oz. and lighter .... ℔ ℔ 39c " " ℔ ℔ 38c

Boiler Sizes.
7 in., 14x52. 8 in., 14x56. 9 in., 14x60.
14 and 16 oz. and heavier ℔ ℔ 38c By the case ℔ ℔ 37c
(And all sizes not over 20 in. wide.)
30x60.
4 and 16 oz. and heavier .... ℔ ℔ 40c
12 oz. .... ℔ ℔ 43c

Brass.

Brown & Sharp's Gauge the Standard for Metal; Old English Gauge the Standard for Wire.

BRASS MANUFACTURERS' PRICE LIST.—dis 20%.
June 10, 1880.

Cash prices for Roll and Sheet Brass. For less quantity than 100 ℔s. add 3c ℔ ℔.

HIGH BRASS.

All Nos. not thinner than to No. 28, wider than 2 in., not wider than 14 in. 30c
All Nos. to No. 28, inclusive, and widths over 14 to 20 in., inclusive 35c
All Nos. to No. 28, inclusive, and widths over 20 to 30 in., inclusive 38c
½c ℔ ℔ advance on each No. above Nos. 26 to 38, inclusive.
All Brass thinner than No. 38 is Platers' Brass, at 59c
Sheets 24x28, and all sheets cut to particular sizes and lengths under 30 in., in width wider than 2 in. 37c
Printers' Rules 45c
Sheets wider than 30 in. and under 40 in. 47c
" " 40 in. and over 50c
Circular Sheets, in diam. from 4 in. to 14, inclusive. 50c
" " " over 14 " 20, " ..45c
" " " " 20 " 30, " ..49c
" " " " 30 " 40, " ..55c
" " " " 40 in. 59c

LOW BRASS.

4c ℔ ℔ more than High Brass.
Gilding Metal, 8c ℔ ℔ more than High Brass.

Platers' or Gold Metal { In Bars .... 48c; Sawed .... 51c; Planed or Polished .... 54c }

FOR SLITTING.

Metal in width 2 in. to ½ in. to No. 28, inclusive, 1c. ℔ ℔ advance.
Metal, in width 2 in to 1 in., thinner than No. 28, 2c. ℔ ℔ advance.
Metal, inwidth 1 in. to ½ hinner than No. 28, 3c ℔ ℔ advanc
Metal, in width ½ in. to ¼, inclusive, not thinner than No. 28, 2c. ℔ ℔ advance.
Metal, in width ½ in. to ¼ thinner than No. 28, 5c. ℔ ℔ advance.
Metal, ¼ in. in width and less, 10c. ℔ ℔ advance.
Any of the above widths cut to particular lengths, add 7c. ℔ ℔.

GERMAN SILVER MARKET METAL AND WIRE.

	Market Metal.	Wire.
4 per cent., 12 inch, to No. 26	$0.12	$0.70
6 " " "	.56	.76
10 " " "	.64	.88
15 " " "	.74	1.03
18 " " "	.80	1.12

German Silver Sheets over 12in. wide and weighing more than 10 ℔s., $2.00 ℔ ℔.
Advance 2c. for each additional inch in width above 12 in., and 2c. ℔ ℔ on each No. thinner than Nos. 26 to 36, inclusive
All German Silver thinner than No. 36 is Platers, at 5c ℔ ℔ additional.
German Silver Scrap one-half less than net price of 12 in. Market Metal. German Silver Turnings, Filings and Chips, half the price of Scrap.

BRASS AND COPPER WIRE.

	High Brass.	Low Brass.	Gild'g and Copper.
No.0 to 20	$0.33	$0.37	$0.13
No.21	.36	.40	.46
No.22	.37	.41	.47
No.23	.38	.42	.48
No.24	.40	.44	.50
No.25	.43	.47	.54
No.26	.45	.49	.55
No.27	.48	.52	.58
No.28	.52	.55	.63
No.29	.55	.59	.66
No.30	.58	.62	.72
No.31	.62	.66	.78
No.32	.66	.70	.84
No.33	.70	.74	.93
No 34	.74	.78	1.03

Spring Wire 20 ℔ ℔ advance.
Flat, Square and Half Round Wire 5c ℔ ℔ advance on Round Wire.
Fancy Wire not less than 10c ℔ ℔ advance of Round Wire.
Brass Rods, No. 8 and larger, not less than 2 feet lengths, 38c.
Wire straightened and cut, smaller than No. 8, and not less than 2 feet lengths, 43c.
Wire and Rods less than 2 feet lengths, special rates.
Twelve cents per ℔ extra for spooling on 1 ℔ spools

MISCELLANEOUS.

Brass Pail Ears $0.40
Brass Door Rail .... .43

SCRAP.—dis. 20 %

High Brass Scrap 12c
Low " 14c
Gilding 16c
Turnings, Filings and Chips half the price of Scrap.
Terms—Net cash. Interest to be added after thirty days.

TUBING.—dis 20 % ℔ ℔

Plain No. 2 inclusive above ½ in. to 3 in. $0.43
" above 3 in. .... .53
Nos. 21, 22, 23, two cents advance on List for each Number.
Nos. 24, 25, 26, four cents advance on List for each Number.
Above No. 26, special rates.
Plain, ½ inch .... .70
" 9-16 " 1.10
" ⅜ " 1.60
All Mandrel Drawn Tubes, 5 cents advance on List Prices.
Fancy Tubing to No. 20 .... 50c
English, Scotch and Extra Patterns Fancy Tubing to No. 20 .... .55
Tubing Sawed or Cut 2 to 4 feet long, 2 cents advance on List.
Add to 2 cents ½ cent for each additional cutting under 2 feet.
All Mandrel Drawn Tubes under ⅜ in., 25 cents per pound advance.

ZINC TUBING.—dis 20 %.

Plain .... .37
Fancy .... .43
Scotch and Extra Patterns .... .45

GERMAN SILVER TUBING.—dis 10 %

5 Per cent.	.80
6 "	.90
10 "	1.05
12 "	1.20
15 "	1.35
16 "	1.40
18 "	1.50
20 "	1.60

STEEL.—DUTY: Bars, Ingots, Sheets and Coils valued at 7 cents ℔ ℔, or under, 2¼ cents; over 7 cents, and not above 11, 3 cents ℔ ℔; over 11, 3¼ cents ℔ ℔, and 10 % ad val. Railway Bars, 1¼ cents ℔ ℔. Railway Bars, in part Steel, 1 cent ℔ ℔. Provided, that Metal cemented, cast or made from Iron by the Bessemer or pneumatic process, of whatever form or description, shall be classed as

American Cast Steel.

For American Steel see quotations under heading of Pittsburgh.

English Steel.—

Best Cast .... ℔ ℔ 15½c
Extra Cast .... ℔ ℔ 16½c
Round Machinery, Cast .... ℔ ℔ 20c
Swaged, Cast .... ℔ ℔ 18c
Best Double Shear .... ℔ ℔ 15½c
Blister, 1st quality .... ℔ ℔ 13c
German Steel, Best .... ℔ ℔ 11c
" 2d quality .... ℔ ℔ 10c
" 3d quality .... ℔ ℔ 9c
Sheet Cast Steel, 1st quality .... ℔ ℔ 15½c
" 2d quality .... ℔ ℔ 14½c
" 3d quality .... ℔ ℔ 13c

ANTIMONY .... See Trade Report

LEAD.—DUTY: Pig $2 ℔ 100 ℔s; old Lead, 1½c ℔ ℔. Pipe and Sheet, 2½c ℔ ℔.

American .... 5⅛ @ 5¼c
Bar .... 6c net
Pipe .... 6½c dis 10 %
Tin Lined Pipe .... 15c, dis 10 %
Sheet .... 7c, dis 10 %
Shot .... Drop 7½c. Buck, 8½c
Chilled Shot 8½c

BABBITT METAL.

N. P. U. .... ℔ ℔ 7½ @ 8c
A. 25c; B, 20c; C, 15c.

TIN.—DUTY: Plates, Sheets, Tagger and Terne, 1.1c ℔ ℔; Electro-galvanized Plates, 2c ℔ ℔; Manufactures of, not enumerated, 35 per cent. ad. val. Bars, Block and Pigs free. Banca, subject to duty of 10 per cent

Banca .... ℔ ℔ 25 @ 26c
Straits .... ℔ ℔ 22c
English .... ℔ ℔ 21 @ 22c

TIN PLATES.

I C 10x14, 14x20	Prime Charcoal	$6.50
I C 12x12	"	6.75
I X 10x14, 14x20	Charcoal	8.50
I X 12x12	" "	8.75
D C 12½x17		6.00
D X 12½x17		8.00
For each additional X add		2.00

COKE TIN PLATE.

	Best.	Ordinary.
I C 10x14, I C 14x20	$6.00	5.00 @ 5.75
I C 12x12	6.25	5.50 @ 5.75

TERNE PLATE

	Prime Char.	2d qual.	Coke.
I C 14x20	$ 5.75	5.50	5.25
I X 14x20	7.50	....	....
I C 20x28	12.00	11.50	11.00
I X 20x28	16.00	....	...
I C 20x200	22.00	.. .	....
I C 14x20 M. F. Brand		8.00	

SOLDER .... No. 1, 12c @ 13 c; No 2, 11c

SPELTER.—DUTY: in Pigs, Bars and Plates, $1.50 ℔ 100 ℔s.

American, cash .... 5⅝ c
Bergen Port from Lehigh Ore 10c
Lehigh, on spot 9c

ZINC.—DUTY: Pig or Block, 1.50 ℔ 100 ℔s. Sheet 2½c ℔ ℔.

Sheet, Cask .... 7½ @ 7¾
" Open .... 7⅝ @ 8

Sundries.

Asphaltum 5c
Benzine .... ℔ gal 16c
Chalk 84c
" Block 8c
Dryer, Patent, Am'n .... ass't cans, 10½c; keg, 9c
Frostings 60c
Glue, White 20c
" " Sheet 50c
Glaziers' Points, Zinc 80
Gum, Copal 36c
" Damar 25c
" Shellac, English 45c
" " dark 42c
Litharge, English 7¾c
Mineral Wool .... ℔ ℔ 1¼ @ 1½c
Pumic Stone, selected Lumps .... 4 @ 6c
" powdered 3½c
Putty, in bladders .... 3 c
" in bulk 2¾c
Spirits Turpentine 47c
Whiting Spanish 84c

Glass.

FRENCH WINDOW GLASS.

Prices current per box of 50 feet.

Single Thick.—Discount 45 to 50 %.

SIZES.	1st.	2d.	3d.	4th.
6 x 8 to 10 x 15	$ 6.50	$ 5.75	$ 5.50	$ 5.25
11 x 14 to 16 x 24	7.25	6.75	6.25	6.00
18 x 22 to 20 x 30	9.25	8.50	7.75	7.25
15 x 36 to 24 x 30	10.25	9.25	8.25	
26 x 28 to 24 x 36	11.00	10.00	9.00	
26 x 36 to 26 x 44	11.75	10.75	9.50	
26 x 46 to 30 x 50	13.25	12.50	10.50	
30 x 52 to 30 x 54	14.00	13.00	11.00	
30 x 56 to 34 x 56	15.00	13.75	12.00	
34 x 58 to 34 x 60	15.50	15.00	12.25	
36 x 60 to 40 x 60	17.50	16.00	13.00	

Double Thick.—Discount 50 to 50 and 5 %.

SIZES.	1st.	2d.	3d.	4th.
6 x 8 to 10 x 15	$ 8.25	$ 7.75	$ 7.50	$ 7.00
11 x 14 to 16 x 24	10.00	9.25	8.75	8.25
18 x 22 to 20 x 30	12.75	11.75	10.75	
15 x 36 to 24 x 30	14.25	13.00	11.75	
26 x 28 to 24 x 36	15.25	13.75	12.50	
26 x 36 to 26 x 44	16.25	14.75	13.50	
26 x 46 to 30 x 50	17.50	16.75	14.25	
30 x 52 to 30 x 54	18.50	17.25	14.75	
30 x 56 to 34 x 56	19.50	18.25	15.50	
34 x 58 to 34 x 60	20.50	19.00	16.00	
36 x 60 to 40 x 60	23.00	21.00	20.00	

An additional 10 per cent. will be charged for Glass more than 40 inches wide. Any size over inches in length, and not making more than 81 united inches will be charged in the 81 united inches bracket

Paper Stock, &c.

(Dealers' Selling Price.)

White Shirt Cuttings, No. 1	6½ @	6¾
" " No. 2	5 @	5¼
Mill Assorted Whites	5¼ @	5½
Unbleached Muslins	5 @	6¼
City Whites, No. 1	4½ @	4¾
New Canton Flannels	6 @	6¼
New Seconds, light	4½ @	....
" dark	3½ @	3¾
No. 2, Whites	3½ @	3¾
Cotton Canvas	4¼ @	4½
Linen Canvas, No. 1	4½ @	4¾
Seconds, City	2 @	2¼
Colors, per 100 lbs	90 @	$1.00
Manila Rope	3¼ @	....
" Tarred	2½ @	2¾
Gunny Bagging, No. 1	2½ @	2¾
" No. 2	2 @	2¼
Kentucky Bagging	4¾ @	....
Burlap Bagging, No. 1	2¼ @	2½
Tar Shakings	2¼ @	2½
Hemp Twine Stock	4¼ @	4½
Hard White Shavings, No. 1	4¾ @	5
Soft White Shavings, No. 1	4¼ @	4½
White Shavings, No. 2, soft	4 @	....
Mixed Shavings, part white	3¼ @	....
Ledger and Writing	3½ @	3¾
Solid Stock	3½ @	3¾
Book Stock, No. 1, light	2½ @	2¾
Old Newspapers	2¼ @	....
Pure Manilas	.... @	....
Bogus Manilas and Hardwares	1½ @	1¾
Commons	90 @	....
Binders' Board Cuttings	1¼ @	1½
Straw Board Cuttings	1¼ @	1¾

Paints, Oils, &c.

Paints.

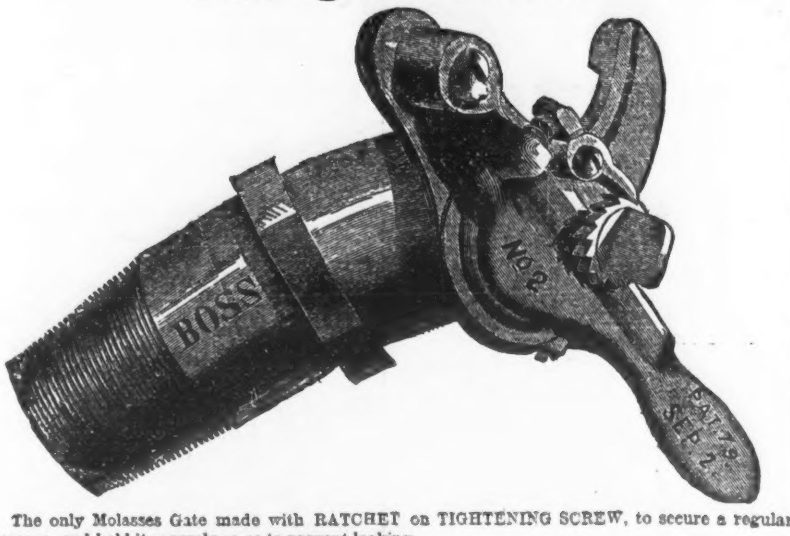
Black Lamp, Coach Painters .... ℔ ℔ 20c
" " Ordinary 6c
" Ivory Drop, fair .... 12 @ 14c
" " best 21c
Black Paint, in oil .... kegs 8c ass't'd cans, 11c
Blue Prussian, fair to best .... 40 @ 55c
" " " in oil .... 45 @ 55c
Blue Chinese dry 85c
" Ultramarine .... 18 @ 30c
Brown, Spanish 1¼c
" Van Dyke .... 10 @ 12c
Carmine, 40 .... combination price
Green, Chrome .... 15 @ 23c
" " in oil .... 14 @ 18 @ 25c
" Paris .... good 25c; best, 30c
" " in oil 30c; 45c
Iron Paint, Bright Red .... ℔ ℔ 2¼c
" Brown .... ℔ ℔ 1½c
" Purple .... ℔ ℔ 3c
" Ground in Oil, Bright Red .... ℔ ℔ 5½c
" " " Red .... ℔ ℔ 5c
" " " Brown .... ℔ ℔ 4½c
" " " Purple .... ℔ ℔ 6c
Mineral Paints .... 1¼ @ 4c
Orange Mineral 10c
Red Lead, American 7½c
" " English .... none in market
" Venetian (N. C.) dry .... $1.65 @ $1.70
" " in oil .... ass't'd cans, 11c; kegs, 8c
" Indian dry .... 9 @ 12c
Rose Pink .... 10 @ 13c
Sienna, American, Raw 4c
" Burnt 4½c
" " in oil .... 10 @ 16 @ 20c
" Raw .... 11 @ 15 @ 25c
Umber, Burnt .... 4 @ 8c
" " in oil .... 9 @ 12 @ 16c
" Raw .... 3½ @ 7½c
" " in oil .... 10 @ 16 @ 18c
Vermillion, Chinese 0.0
" English .... 55 @ 57½c
" Trieste 1.10
" American, Common 15c
White Lead, American, pure dry 8c
" " " in oil .... 8½ to 9c
White, Paris, English, prime .... in bbls. 2 @ 2½c
Yellow Ochre, French $1.75
" " " in oil ... ass't'd cans, 11c; kegs, 8c
" " Vermont .... in casks, 1½c
Yellow Chrome .... 17 @ 27c
" " in oil .... 14 @ 18 @ 25c
Zinc White American No. 1, dry .... 5 @ 5½
" No. 1, in oil 9c
" French (Paris) .... 8 @ 10c
" in oil .... @ 10c

Oils.

Linseed, Raw, in casks and bbls .... gal. 53c
" Boiled " " 61c
Bleached Whale .... ℔ gal. 63c
" Sperm .... ℔ gal. $1.18
" Elephant 67c
Signal 60c
Prime Lard 70c
No. 1 .... 69c
West Virginia .... 17c @ 24c
Drilling 40c
Empire Cylinder 65c
Miners' Oil .... 35 to 45c
Fish Oil, pressed 44c
Neatsfoot 75c
Tallow 60c
Machinery 40c
Engine 50c

BOSS MOLASSES GATE.

Coddington's Patent.



The only Molasses Gate made with RATCHET on TIGHTENING SCREW, to secure a regular pressure, and hold it securely so as to prevent leaking.

ALSO,

KIMBALL'S SOLID CAST-STEEL SHOVELS & SPADES,

Lockwood's Solid Cast-Steel Hoes,

Norris' Patent Frame Pulleys.

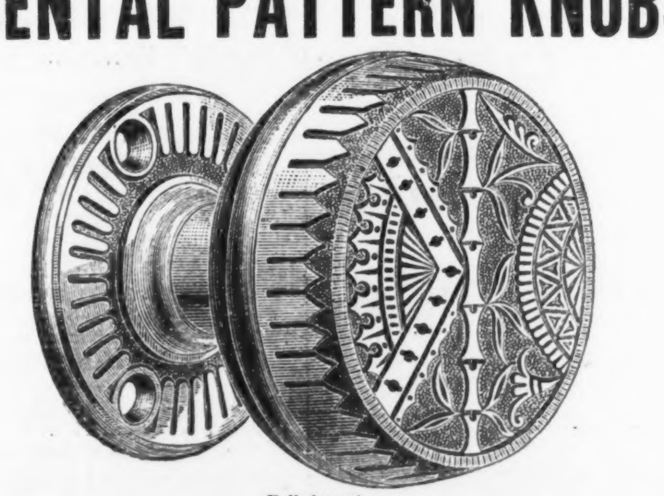
Send for Price List.

KIMBALL SHOVEL CO., Sole Manufacturers,

Office, 67 German Street, BALTIMORE, MD., U. S. A.

BRANFORD LOCK WORKS,

ORIENTAL PATTERN KNOBS.



Full size cut.

We have issued, under date of June 10, a complete revised Price List, a copy of which, with our 1879 Illustrated Catalogue, will be furnished to the trade free on application. Said Catalogue contains illustrations and descriptions of over 1000 different varieties of Door Locks, Knobs and Escutcheons.

MANUFACTORY AND OFFICE,

BRANFORD, CONN., U. S. A.

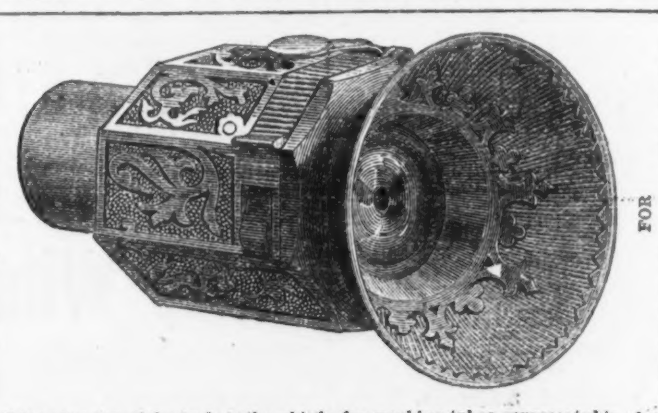
PATENT

Elliptic Spring Whistles

FOR

SPEAKING TUBES.

Patented April 15th, 1879.



We call the attention of the trade to the whistle for speaking tubes, represented in above cut, as being superior, in a mechanical point of view, on account of the

PATENT ELLIPTIC SPRING,

which is much less liable to break and get out of order than the spiral spring usually used. These whistles being made entirely of metal, are very strong and durable. They are offered in a variety of styles at very reasonable prices. Send for illustrated circular and quotations.

We also invite an examination of our **PATENT REVERSIBLE DOOR LOCKS**, which by their peculiar construction, combine **simplicity, strength and durability.** In these Locks the combination of the Patent Lever and Spring renders the latch movement very easy and prompt in action.

Illustrated catalogues and price lists furnished on application.

TRENTON LOCK AND HARDWARE CO.,

Manufacturers of **Superior Building Hardware.** Trenton, N. J.

AGENTS.

JAMES M. VANCE & Co., 211 Market St., Philadelphia, Pa.; JAMES MARSHALL, 48 Warren St., New York.

R. J. ANDERSON, President. A. B. PARKER, Vice-Pres. JAS. A. VAN BRUNT, Sec'y & Treas.

NEW YORK WIRE AND WIRE ROPE CO.

Manufacturers of

WORKS: South Brooklyn AND Mott Haven, N. Y.

WIRE ROPE

New York Office: 23 Astor House.

WIRE, FURNITURE SPRINGS & UMBRELLA FRAMES.

LAFLIN MFG. CO., Westfield, Mass.

Manufacturers of

PAT. IMPROVED STEAM HEATING APPARATUS.

LAFLIN MFG. CO.'S

Pat. Single Iron Plane

Made of extra quality iron. A practical labor-saving tool. Cuts against the grain equally as well as with it Can be adjusted instantly to cut a coarse or fine shaving, and excels any double iron plane ever produced.

PATENTS

303 Euclid Ave., Cleveland, O.	TRACY, DYER & WILBER, Solicitors and Counsel in Patent Litigation	519 Seventh St., Washington.

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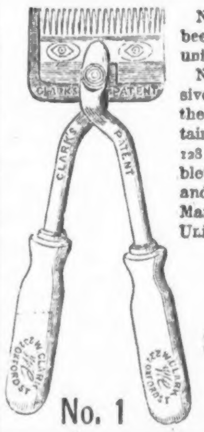
CLARK'S PATENT

ENGLISH HORSE CLIPPERS.

Prize Medals Awarded, Paris, 1878. Grand Prize Awarded, Sydney, 1879.



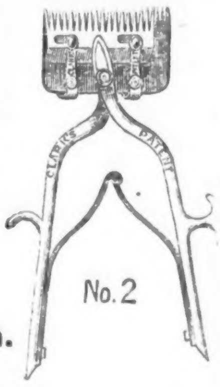
No. 1

No. 1. This well-known instrument has now been before the Public for 12 years, and has given universal satisfaction.

No. 2. One-handed Clipper for Heads. Extensively used by all Barbers, and has been before the Public for the last seven years. To be obtained wholesale, of Messrs. Moseman & Bro. 128 Chambers St., New York, Messrs. I. Hambleton & Son, 221 Spruce St., Philadelphia, Pa., and Messrs. Field, Luter & Co., Madison and Market Sts., Chicago, and all Merchants in the United States, and of the Patentee,

W. CLARK,

232 Oxford St., London.



No. 2

AGENTS WANTED.

AKRON IRON CO., Akron, Ohio,

SOLE MANUFACTURERS OF PATENT

HOT POLISHED SHAFTING.

This Shafting commends itself to the trade generally as superior to any shafting ever before introduced to the market, for the following reasons, viz.:

1st.—It is perfectly straight and round.

2d.—It can be rolled accurately to any desired gauge.

3d.—It has the beautiful blue finish of Russia Sheet Iron, rendering it less liable to rust or tarnish than shafting of the ordinary finish.

4th.—It will not spring or warp in key seating, like most of the other manufactured shafting sold in the market, and, as a consequence, is admirably adapted for line and counter-shafting.

5th.—The surface is composed of magnetic oxide of iron, forming a superior journal or bearing surface.

6th.—It is made of superior stock.

Price lists, with references and other information, furnished on application to us,

AKRON IRON CO., Akron, Ohio,

Or to our Agent, **E. P. BULLARD, 14 Dey St., New York City,** General Agent for New York City and other Eastern States.

PATENT UNIVERSAL

SLICING & GRATING MACHINE.

For slicing Fruit, Vegetables, Confectionery, &c., &c.

The most rapid Slicer and Cutter ever offered. The only Self-Feeding Grater in use. It is simple in construction, strong and durable. Can be taken apart without the use of tools.

We make a Special size for grating Cocoanuts, Almonds &c, for confectioners' use.

Agents wanted for each county or state.

The entire right of the Eastern States for sale.

Send for Circular and Price List.

F. GLEMSER & CO.,

211 Wade Street,

Cincinnati, O.

PECK & SNYDER'S

SELF-ADJUSTING AMERICAN CLUB SKATE

Has held its place in the market for the past five years as the "Boss Skate." It pays dealers to keep them, as they sell at sight, requiring no key nor wrench, no nuts nor screws to lock. Perfect in style, finish and workmanship. We mail a complete price list of Skates with trade discounts to dealers on application. Address, **Manufacturers and Jobbers of Skates and Straps,**

PECK & SNYDER, 124 and 126 Nassau Street, New York.

Wilson Bohannan,

Manufacturer of Patent

BRASS PAD LOCKS

For Railroad Switches, Freight Cars, and the Hardware Trade. All sizes, with Brass and Steel Keys, with and without chains.

Patent Horizontal Rim Cylinder Night Latch.

Self-adjusting to doors of any thickness, with Patent Stop and Drawer Back Knob RIGHT OR LEFT HAND.

PASSENGER CAR LOCKS, Bronzed, Nickel-Plated and Japanned.

☞ Catalogues and Samples sent upon application. **BROOKLYN, N. Y.**

COXE BROS. & CO.,

Cross Creek Lehigh Coal.

The Purity and Strength of this Coal especially adapt it for the working of Iron and Metals.

GENERAL OFFICE, Room 12 Trinity Building, 111 Broadway, New York.

BRANCH OFFICES, { Chicago, Ill., 90 LaSalle Street. Philadelphia, 206 Walnut Place.

E. B. & S. W. ELY, Agents, P. O. Box 262, N. Y.

TO NICKEL PLATERS.

American Nickel Works, Camden, N. J., Aug. 1, 1880.

ANODES.—I am now prepared to supply **PURE ROLLED NICKEL ANODES** in any quantity.

These superior Anodes wear away in the solution evenly and completely, like rolled silver or copper plates, thus avoiding the vexation and loss caused by the crumbling and breaking of cast Anodes. They plate very evenly and regularly.

Though necessarily higher in price per pound, they are so much thinner (usual thickness 3-32 inch) that to furnish a tank of any given size costs but about half as much as if furnished with cast Anodes.

Though perfectly protected by my patent for Malleable or Rolled Nickel Anodes of Jan. 6, 1880, as well as by Dr. Fleitmann's patent for making nickel malleable (of which I am sole and exclusive American licensee),

I make no charge of royalty for the use of these Anodes,

which are quite free from any patent claim of any other parties for Nickel Anodes.

SOLUTION.—In order to meet the wants of those who prefer to make their own solutions, I now make **NICKEL OXIDE** of high purity and easily soluble in any acid. It is better for this purpose than metallic nickel or nickel carbonate.

I also make and offer for sale Cast Nickel Anodes and Nickel-Ammonia Sulphate. Pure Grain Nickel always on hand. Malleable Nickel Castings made to order.

All these articles, being made with the greatest care from the ores of my own nickel mine, can be depended upon as of the highest quality and greatest uniformity.

ROLLED NICKEL ANODES.... $2.50 per lb.
NICKEL OXIDE................ 1.50 "

JOSEPH WHARTON.

Post Office Address,

P. O. Box 2786, Philadelphia.

WESTON DYNAMO-ELECTRIC MACHINE

NICKEL.

The rapid increase in the use of Nickel-Plating owing to the introduction of the Weston Machine and the very low price of nickel material, enables us to give greatly reduced estimates for complete outfits.

We are furnishing outfits specially adapted for Stove Work, giving a pure white deposit on plain or mat surfaces.

Outfits complete, with Dynamo-Electric Machine Tanks, Anodes, Solution, &c., &c., $250.

We beg to refer to the following Stove Manufacturers among 500 other houses using the Weston Machine: Richardson & Boynton, S. S. Jewett & Co., Fuller, Warren & Co., Perry & Co., Detroit Stove Works, Michigan Stove Co., Co-operative Stove Co., E. & C. Gurney, Hamilton & Toronto, and many others.

INFRINGEMENTS.

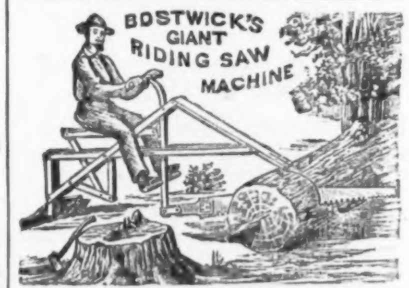
We call attention to infringements of the Weston Machine, in which Automatic Switches are used to prevent change of current. The Weston Co. are owners by grant or purchase of all forms of Automatic Switches for Plating Machines. The adoption of these machines will certainly lead to great loss to parties purchasing or using them.

CONDIT, HANSON & VAN WINKLE

Sole Agents *NEWARK, N.J. U.S.A.*

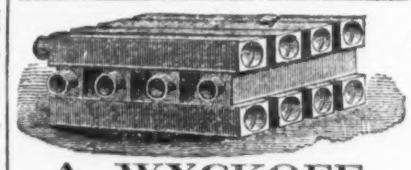
NEW YORK OFFICE, 92 & 94 Liberty St.

ENGLISH AGENCY: 18 Caroline Street, Birmingham.



The Great Success of the Wonderful Improved Labor-saving **BOSTWICK'S GIANT RIDING SAW MACHINE** is fully demonstrated by the large number in use and present demand. It saws logs of any size. One man can saw more logs or cord wood in one day, and easier, than two men can the old way. It will saw a 2-foot log in three minutes. Every farmer needs one. Township agents wanted. Send for illustrated circular and terms.

Address, FARMER'S MANUFACTURING CO., 178 Elm Street, Cincinnati, Ohio.



A. WYCKOFF,

Manufacturer of

Wyckoff Patent Wood Water Pipe,

Steam Pipe Casing,

Chain Pump, Tube, Curbs, Reels, Rubber Valves, Chain, &c.

Established 1855. Send for pamphlet.

ELMIRA, N. Y.

Specially Low Prices for

VERTICAL ENGINES.

The best made. 2½ to 15-horse power. Write for full particulars to

WILLIAM COOKE,

6 Cortlandt Street, NEW YORK.

A. PARDEE, Hazelton, Pa. J. G. FELL, Phila.

A. PARDEE & CO.,

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PHILADELPHIA,

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The following superior and well-known Lehigh Coals are mined by ourselves and firms connected with us, viz.

A. Pardee & Co. { HAZLETON. CRANBURY. SUGAR LOAF.

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Pardee, Sons & Co. MT. PLEASANT.

Steel.

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MANUFACTURERS, IMPORTERS, EXPORTERS & GENERAL MERCHANTS

MANUFACTURERS OF

CAST STEEL WIRE for all Purposes, Special Wire, Market Steel Wire, Prime Coppered Spring Wire, and of all Kinds of Furniture Springs, &c.

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Manufacturers of

CRESCENT STEEL,

In Bars, Sheets, Cold-Rolled Strips, &c.

Polished, Compressed Drill Rods and Wire,

Warranted equal to any imported in *quality, finish and accuracy.*

Also Common Grades.

Established 1810.

J. & RILEY CARR,

SHEFFIELD, ENGLAND.

Manufacturers of the "Celebrated

'DOG BRAND" FILES.

Also of Superior

STEEL

For Drills, Cold Chisels, Tools, Taps, Dies, &c.

COLD ROLLED STEEL for Clock Springs, Corsets, &c.

SHEET CAST STEEL for Springs, Saws, Welding and Stamping Cold, &c.

GERMAN, MACHINERY, ENGLISH AND SWEDES SPRING STEEL,

And all other descriptions for machinists and agricultural purposes.

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Sheffield, England,

Manufacturers of the Celebrated

Cast and Double Shear

STEEL.

In Bars, Sheets and Coils, for fine Pen and Pocket Cutlery, Table Knives, Mining Tools, Dies, Files, Clock and other Springs, and Tools of every variety.

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WILLIAM BROWN, Representative.

Cleveland Rolling Mill Co.,

Manufacturers of

BESSEMER STEEL

AND

Iron Rail and Fastenings,

SPRING STEEL

AND

WIRE OF ALL KINDS,

Tire, Axles and other Forgings,

oiler Plate, Galvanized and Black Sheet Iron, Corrugated Roofing and Siding of Siemens-Martin, Bessemer Steel and Iron.

CLEVELAND, OHIO.

H. CHISHOLM, President. WM. CHISHOLM, Vice President.

E. S. PAGE, Secretary. W. B. CHISHOLM, Gen. Manager.

MIDVALE STEEL WORKS,

NICETOWN, PHILADELPHIA.

Best Warranted Cast Steel for Machinists' Tools,

Taps, Dies, Punches, Shear Blades, Chipping Chisels and Granite Rock Drills,

Extra Mild Center Steel, special for Taps,

ALSO,

MACHINERY AND CAST SPRING STEEL, HEAVY AND LIGHT FORGINGS.

Warehouse, No. 12 North 5th St., Philadelphia.

Address *A. M. F. Watson*, General Sales Agent.

STEEL Gautier Steel.

See Page 3.

Steel.

NEWARK STEEL WORKS.

BENJAMIN ATHA & CO.,

Manufacturers of

BEST REFINED CAST STEEL

And grades of Steel specially adapted for Lathe Tools, Chisels and Taps and Dies.

Warranted most superior for TOOLS AND GRANITE ROCK DRILLS.

A full assortment of this universally approved OLD BRAND and other Steels for sale by

EDWARD FRITH & SON, Agents,

No. 241 Pearl St., New York.

LABELLE STEEL WORKS.

SMITH, SUTTON & CO.,

MANUFACTURERS OF ALL KINDS OF

STEEL.

Also Springs, Axles, Rake Teeth, &c.

OFFICE & WORKS, Ridge, Lighthill & Belmont Sts., & Ohio River, Allegheny.

Post Office Address, Pittsburgh, Pa.

Represented at Boston by WETHERELL BROS., 31 Oliver St.; at Milwaukee by JOHN PRITZLAFF, 43 to 49 West Water St.; at Chicago by S. D. KIMBARK, 80 to 84 Michigan Ave.

ALBANY & RENSSELAER IRON & STEEL CO.,

Troy, N. Y.,

Office in New York City, 56 Broadway,

MANUFACTURERS OF

BESSEMER STEEL RAILS,

Machinery Steel, Merchant and Ship Iron.

HORSE SHOES.

SAM'L G. B. COOK & CO., Agents for Southern States,

67 and 69 German Street, Baltimore, Md.

FRANCIS HOBSON & SON

97 John Street, NEW YORK,

Sole Manufact'rs of **"CHOICE"** Extra Cast Steel.

Manufacturers of all Descriptions of Steel.

Manufacturers of Every Kind of Steel Wire.

Don Works, Sheffield, England.

CHAS. HUGILL, Agent.

THE

STEEL COMPANY OF SCOTLAND, LIMITED,

(SIEMENS' PROCESS,)

MANUFACTURERS OF

Steel Rails,	Steel Ship Plates.
Steel Blooms for Rails,	Steel Boiler Plates,
Steel Blooms for Wire,	Steel Angles,
Steel Wire Rods,	Steel Forgings,
Steel Locomotive Fire Boxes,	Steel Castings.

JAMES LEE & CO.,

Resident Agents for the United States,

72 Pine Street, New York.

GEO. SANDERSON & CO.,

MANUFACTURERS AND

Importers of STEEL,

Removed to 30 Gold Street, New York.

Particular attention is paid to quality and temper for FILES, SAWS, EDGE TOOLS, TABLE and POCKET CUTLERY, TOOLS, TAPS and DIES; also for COLD ROLLED STEEL for CLOCK SPRINGS, CORSET CLASPS, &c.

A Large Assorted Stock of JOHN ROTHERY'S FILES always on hand.

MERIAM & MORGAN PARAFFINE CO.

OILS **PARAGON AXLE GREASE**

CLEVELAND, O.,

Manufacturers of

Cold Pressed Paraffine Oil,

Refined Paraffine Wax,

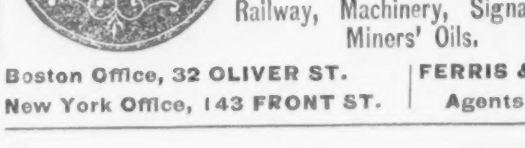
AXLE GREASE,

And a full line of

Railway, Machinery, Signal and Miners' Oils.

Boston Office, 32 OLIVER ST. | FERRIS & AVERY, Chicago,

New York Office, 143 FRONT ST. | Agents for Paragon Axle Grease



Beardsley Scythe Co.,

Manufacturers of

GRASS, GRAIN & BUSH SCYTHES,

Hay Knives & Corn Knives,

West Winsted, Conn.

See our advertisement in *The Iron Age* first issue of each month.

Steel.

R. MUSHET'S

Special Steel

FOR

LATHES, PLANERS, &c.

Turns out at least **double work** by increased speed and feed, **and cuts harder metals** than any other Steel. Neither hardening nor tempering required.

Sole Makers,

SAMUEL OSBORN & CO.,

Sheffield, England.

Represented in the United States by

B. M. JONES & CO.,

Nos. 11 & 13 Oliver Street, **BOSTON.**

STAR ★ BRAND

BLACK LEAD STOPPERS,

FOR

Bessemer Converters and Siemens-Martin Furnace Ladles.

All the regular sizes in stock, with Nozzles to fit each size. Special sizes or shapes made to order from sample or drawing.

Black Lead Crucibles, all kinds and sizes.

TAUNTON CRUCIBLE COMPANY,

Taunton, Mass.

D. A. TREFETHEN, Treas. W. T. MACFARLANE, Agent.

NAYLOR & CO.,

99 John St., New York. 6 Oliver St., Boston, Mass.

W. R. HART, Agent,

208 S. Fourth St., Philadelphia, Pa.

THOS. J. HOYT, Agent,

709 North Second St., St. Louis, Mo.

MANUFACTURERS OF

STEEL COMPRESSED SHAFTING,

"Benzon" Homogeneous Plates

For Boilers, Fire-boxes, &c.

Axles, Crank Pins, Spring Steel,

And all other kinds of

Martin-Siemens Steel and Iron

For Railroad purposes, &c.

IMPORTERS OF

IRON AND STEEL RAILS,

SWEDISH IRON,

Tin and Terne Plates and Metals.

Emery, Grindstones, &c.

Walter R. Wood,

GRINDSTONES.

Berea, O., Nova Scotia, & other brands

283 and 285 Front Street, New York.

BOYD & CHASE,

The largest manufacturers in the world of

OIL STONE

Of all description.

107th Street and Harlem River.

Send for Illustrated Price List. **NEW YORK.**

THE VITRIFIED

Emery Wheel.

The only one made on scientific principles. *It runs dry, in water, or in oil.* Can be made hard enough for the hardest wood, and soft enough for the most delicate tools. It heats less than any other wheel. It will cut Iron, Steel, Brass, Silver, Copper, Marble, Granite and Wood; also, Rubber, Paper and Iron Rolls. Address

VITRIFIED WHEEL CO.,

100 Elm St., Westfield, Mass.

ASHLAND EMERY CO.

CHARLES ALDEN, MANAGER.

Importers and Manufacturers of PURE

TURKISH EMERY

A. A. IRVINE & CO., Agents,

14 MURRAY ST., NEW YORK.

Send for quotations and samples.

H. S. WOOD & CO.,

Manufacturers of	Importers of
Berea, O., Black River, O., Lake Huron, Mich.,	**Newcastle, Eng., Wickersley, Eng. Nova Scotia,**

GRINDSTONES

33 West & 58 Washington Sts., N. Y.

BARBER'S

PATENT

COUNTERSINK.

Diploma awarded at Mechanics' Fair, Boston, 1878. Hole bored any depth, and countersunk for any size screw at one operation. $2 per doz.; discount in quantity. Sample by mail 30 cts. D. F. BARBER, 1321 Washington St., Boston.

Specially Low Prices for

VERTICAL ENGINES.

The best made. 2½ to 15-horse power. Write for full particulars to

WILLIAM COOKE,

6 Cortlandt Street, *NEW YORK.*

PHILADELPHIA.

(Corrected Weekly by Lloyd, Supplee & Walton.)

Terms, 30 days. For 60 or 90 days, interest added at 10 per cent. per annum.

Anvils.
Peter Wrights, ℔ ℔....10¾c
Over 250 lbs....11c
Eagle (American)....10c ℔ ℔—dis 20 %

Apple Parers.
Keystone Centennial, 1875....$4.25
" " 1877....5.00
Reading No. 72....5.00
" No. 74....6.00
" No. 75....7.00
" No. 78....7.50
Rotary Peach Parers....13.50
Lots of 10 to 25 dozen special prices.

Axes.
Hunt's Kentucky and Yankee....per doz $11.00
Mann's Red Warrior.... " 11.00
Richland Chief.... " 10.00
Beveled Axes....add 50c " net
Double Bit Axes....net " 22.00

Augers and Auger Bits.—New List January 1.
Bates' Nut Augers....dis 40 %
Cook's Augers....dis 40&10 %
Watrous' Ship Augers....dis 15 %
Benjamin Pierce Auger Bits....dis 35 %
Griswold Auger Bits....dis 40 %
Cook's "....dis 40&10 %
Jennings' "....dis 10, 10&10 %
Bonney's Pat. Hol. Augers, list $48 ℔ doz..dis 25&10 %
Stearns' Pat. Hol. Augers, list $48 ℔ doz....dis 20&10

Balances.
Light and Common....dis 15&10 %

Bells.
Bevin Bros. Mfg. Co. Light Hand Bells....dis 60&10 %
Swiss Pattern Hand Bells....low list dis 40&10 %
Connell's Door Bells....dis 35 %
Gt. Western & Kentucky Cow, new list....dis 50 %

Bolt and Rivet Clippers.
Chambers' No. 1, for ⅝ bolt....each, $7.50 } dis 15 %
" No. 2, " ¾ " .... " 9.00 }
" No. 3, " ⅞ " .... " 12.00 }

Boring Machines.
Upright, without Augers....List 5.50 } dis 40 %
Angular, without Augers.... " 6.75 }

Bolts.—Eastern Carriage Bolts....dis 70&10 %
Philadelphia "....new list dis 60&10 %
Stanley, Wrought Shutter....dis 50&10 %

Braces.—Barber's....dis 40&5 %
Backus....dis 60 %
Spofford....dis 50&5 %
American Ball....dis 40&10 %

Butts.—Cast Fast Joint, Narrow....dis 40&10 %
" " Broad....dis 40&10 %
Cast Loose Joint, Narrow....dis 50&10 %
" " Broad....dis 50&10 %
" Acorn, Loose Pin....dis 50&10 %
" " Jap'd....dis 55&10 %
" Mayer's Loose Joint....dis 55&10 %
Wrought Loose Pin....dis 50&10 %
" Table Hinges and Back Flaps....dis 40&10 %
" Narrow, Fast....dis 40&10 %
" Loose Joint....dis 50&10 %

Blind Butts.
Parker....dis 70 %
Clark....dis 60, 10&10 %
Shepard....dis 60, 10&10 %
Lull & Porter....dis 60&10 %
Huffer's....dis 50 %

Chains.—German Halter and Coil, new list Oct. 22, 1879....dis 40 %
Galvanized Pump....℔ ℔ 10c net
Best Proof Coil Chain—English.
℔ ℔.... 12 10 8½ 7½ 7¼ 7 gold
3-16 ¼ 5-16 ⅜ 7-16 ½ in.

Chisels.—Socket Framing....dis 65&10 %
Socket Firmer....dis 65&10 %
Butcher's....$5.00 to £ gold

Casters.—Bed (new list July 1, 1880)....dis 25&10 %
Plate....dis 25&10 %

Coffee Mills.—Box and Side, new list Jan. 1, 1880....dis 35 %
Enterprise....dis 20 %

Cutlery.—Walden Pocket....new list net
Landers, Frary & Clark, J. Russell & Co., Lamson & Goodnow Mfg. Co. and Meriden Cutlery Co., Manufacturers' prices net.

Drawing Knives.
Hart Mfg. Co.'s....dis 65&10 %
Adjustable Handle....dis 15 %

Fry Pans.
Tinned....dis 45 %
℔ doz. $3.50 4.00 4.50 5.00 5.50 6.50 7.50 9.00 10.00
No.... 0 1 2 3 4 5 6 8
Burnished....dis 60 %
℔ doz. $3.00 3.75 4.25 4.75 5.25 6.00 7.00 8.00 9.00
No.... 0 1 2 3 4 5 6 7 8

Files.
Nicholson....dis 30 %
Disston....dis 30 %
Butcher....$4.50 £
Spencer....$4.50 @ 4.75 £

Fluting Machines.
Eagle—3½ in. roll....each, $2.15 } dis 10 %
" —5½ in. roll.... " 2.85 }
Crown—4½ in. roll.... " 3.50 } dis 10 %
" —6 in. roll.... " 4.00 }
" —8 in. roll.... " 6.50 }
Geneva Fluter....dis 20 %
Favorite com. Fluter & Sad Iron....℔ doz $10.50 net

Hammers.
Yerkes & Plumb's, new list....dis 30 %

Hatchets.
Yerkes & Plumb, new list....dis 30 %
Hunt....dis 15&5 %

Hinges.
Strap and T....dis 45&10 %

Horse Nails.

	Nos. 5	6	7	8	9	10
Ausable	30	27	25	24	23	22
" Pol'ed & P't'd and Blued and Pointed	31	28	[illegible]	25	24	23
Globe....New list	28	25	23	22	21	20
Clinton		22	20	19	18	17
" Polished & Pointed		23	21	20	19	18

Porter, all sizes....℔ ℔ 15c. net
Discount on Ausable and Clinton, 20 %; Globe, 10%

Locks and Knobs.
Branford....dis 50&2 %
Gaylord Cabinet....dis 10&2 % cash
American Padlocks....dis 40 &2 % cash
Scandinavian Padlocks....dis 50 %
℔ doz..$5.00 5.50 6.50 7.50 8.50 10.50 12.50 } dis 60 %
No.... 57 58 59 60 61 62 63
℔ doz....$18.00 26.00 33.00 } dis 60 %
No.... 64 65 66

Lanterns.
Nail City....℔ doz, $9.00 net
Square Candle and Oil....℔ doz
Tubular....No. 0, $8.65; No. 1, $10.15 ℔ doz net
Globes, 35 cents extra per doz. net.

Lawn Mowers.—Pennsylvania....dis 30&10 %
Philadelphia....dis 30&10 %
Excelsior....dis 30&10 %

Lawn and Garden Pumps.
Holland Patent....List $5.00 dis 10 %

Mattocks.
Long and Short Cutter....new list
Pennsylvania Pattern....per doz

Molasses Gates.
Enterprise Mfg. Co.'s Measuring Faucets....dis 20 %
Stebbins' Gates....dis 50&10 %
Lincoln's "....dis 50&10 %
Landers, Frary & Clark's Petroleum....dis 20&10 %
Brass Liquor Cocks, new list Jan. 1 1880....dis 40 %
Cork Lined "....dis 70 %

Meat Cutters.—Pennsylvania Meat Cutter..dis 50 %
Dixon's....dis 30 %
Woodruff....dis 30 %
Stowe....dis 30 %
Hale's....new list, dis 40, 2&10 cash
American....dis 25 %
Stuffers....dis 25 %
Enterprise Stuffers....dis 20 %

Planes.—Ohio Tool Co....dis 25 % } 7½ % cash in 10 days.
Scioto....dis 30 % }
Auburn....dis 25 % }
New York Tool Co....dis 30 % }
Bailey....dis 20&10 %

Plane Irons.—Ohio Tool Co....dis 10&5 %
Butcher's....£, $5.50

Plumbs and Levels.
Stanley's Adjustable....dis 60&10 %
" Non-Adjustable....dis 60&10 %

Picks.—New list....

Pumps.—Bickford....$5.00, dis 10 %

Rules.—Stanley Boxwood....dis 60&10 %
Stanley Ivory....dis 50&10 %

Steelyards.—Hart's Pattern....dis 30&10 %
℔ doz....$14.50 17.75 21.00 26.50 32.00 35.50
Lbs.... 50 100 150 200 250 300
American Pattern....dis 30&10 %
℔ doz....$8.00 10.25 13.75 15.60 16.75 19.50
Lbs.... 50 100 150 200 250 300

Squares.
Steel and Iron....dis 50 %; full case, dis 50&10 %
Try Squares, Stanley....dis 45&10 %
Disston's Try Squares....dis 12½ %

Scythes.—Golden Clipper, Damascus Blade, Boxed and Sharpened....℔ doz $9.00 net
Clipper No. 10, Bronzed Blade, Boxed and Sharpened....℔ doz $8.50 net
Clipper No. 5, Painted Red, Boxed and Sharpened....℔ doz $8.00 net

Saws.—Disston's Hand, Panel and Rip....dis 20 %
Disston's Circular....dis 35 %
" Cross-Cut No. 2, Plain Tooth....dis 25 %
" " Patent Tooth....dis 25 %
" " Champion Tooth....dis 25 %
Boynton's Lightning Cross Cut, new list....dis 20 %
" One Man, all lengths, "....dis 20 %
" Billet Webs, 30 inch, "....dis 25 %
" Lightning Buck Saws, cross bar....dis 25 %
" " Hand, Panel and Rip....dis 25 %

Shovels and Spades.
Rowland....dis 40&10 %
Oliver Ames & Sons, new list....dis 10 %
Griffith....dis 40&10 %

Sad Irons.—5 to 10 lbs....℔ ℔ 3¼c
Mrs. Potts' Patent....dis 30 %

Stone.—Arkansas Oil Stone....℔ ℔ $2.00 net
Washita Extra....℔ ℔ 27c net
" No. 1....18c
" No. 2....15c
" Slips....36c
" Axe....18c net
Turkey Oil Stone No. 1....℔ ℔ $1.00 net
Hindostan Oil Stone No. 1....℔ ℔ 6c } dis 30 & 10 %
" Axe Stone.... " 8c }
" Slips.... " 18c }

Screws.
Flat Head Iron....dis 45 %
" Brass....dis 45 %
Round Head Brass....dis 40 %
" Iron....dis 40 %

Spoons.
Plated....dis 33⅓&5 %
German Silver....dis 40&10 %
Britannia, Boardman's....dis 60 %
" Parker's....dis 60 %
Tinned....dis 10 %

Springs.—Torrey....℔ doz $2.10 10 %
Philadelphia....5 in., $2.00; 8 in., $7.00 ℔ doz, dis 25 %
Chatfield No. 1, $2.75; 2, $3.25; 3, $4.00 ℔ doz, dis 33⅓ %
Gem Coil No. 1, Large Jap'd....℔ doz $3.40 } net
" No. 2, Medium Jap'd....2.40 }
" No. 3, Small Jap'd....2.00 }

Stocks and Dies....dis 10&5 %

Stove Polish.—Gem....℔ gross, $4.50, dis 5 %
Dixon....2.75 net
Onyx....$4.00 @ 4.25 net

Tacks, Brads, &c.....dis 20&10 %
Shoe Nails—4-8, 90c; ¾-8, 10c ℔ ℔....10 %
Double Pointed Tacks....dis 40&5 %

Traps.
Genuine Oneida—Newhouse....dis 30 %
Im. Oneida—Newhouse list, first qual....dis 50 %

Vises.—Solid Box, Trenton new list....dis 25 %

Wrenches.—Agricultural....dis 60&10 %
Coes' Genuine....dis 50 %
" Mechanics'....dis 60&10 %
" Mall. Bar....dis 70 %
Philada. Tool Co., Duplex....dis

Wire.
Bright or Ann'd, No. 0 to 18....dis 45 to 50 %
" " No. 19 to 26....dis 52½ to 57 %
" " No. 27 to 36....dis 60 to 65 %
Coppered, 0 to 18....dis 40 to 45 %
Tinned Broom Wire....dis 47½ to 50 %
Galvanized No. 7 to 18....Market List, dis 35 to 37½ %

Wringers.
Peerless No. 2½....$60.00
" " 2....63.00
Universal, No. 2½....60.00
" " 2....63.00
Novelty, No. 1....60.00
" " 2....63.00

PITTSBURGH.

Merchant Iron.

Terms.—Note or acceptance at 60 days, with current rate of exchange on New York, or a discount of 2 per cent. for cash, if remitted within 10 days from date of invoice.

Flat Bar.
1¼ to 4 by ⅜ to 1 inch....2.50
4¼ to 6 by ⅜ to 1 "....2.60
1 to 1⅛ by ¼ to ⅝ "....2.60
1¼ to 4 by 1⅛ to 1¼ "....2.60
1 and 1⅛ by ⅜ to ⅝ "....2.70
⅝, ¾ and ⅞ by ⅜ to ⅝ inch....2.70

Rounds and Squares.
[illegible]....2.70
[illegible]....2.90
[illegible]....3.10
[illegible]....3.30
[illegible]....3.50
[illegible]....5.50

Oval Iron.
[illegible]....3.30
[illegible]....3.70

Half Oval and Half Round.
[illegible]....4.00
[illegible]....5.50

Horse Shoe.
⅝ to 1⅛ by 5-16 to ¾ inch....3.50

Wagon Box Iron.
[illegible], Nos. 13 and 14....3.70
[illegible]....3.50
[illegible]....4.00
[illegible]....3.80
[illegible]....4.40
[illegible]....4.10

Heavy Bands.
[illegible]....2.70
[illegible]....2.70
[illegible]....2.80
[illegible]....3.00
[illegible]....3.50

Light Bands.
[illegible]....3.00
[illegible]....3.10
[illegible]....3.10
[illegible]....3.20
[illegible]....3.40
[illegible]....3.50
[illegible]....3.70
[illegible]....3.80
[illegible]....4.00
[illegible]....4.10
[illegible]....4.30
[illegible]....4.40

Hoop Iron.
[illegible]

The prices under Hoop Iron do not apply to Cotton Ties.
1-10c per lb. extra will be charged for each gauge lighter than the lightest indicated.
1-10c per lb. extra will be charged for cutting Hoops to specified lengths.

Barrel Hoops.
1¼ to 2 in., cut to length.
[illegible] lbs., per set of 6 hoops....3.50
8 lbs. and less than [illegible] lbs. per set of 6 hoops....3.60
Less than 8 lbs. per set of 6 hoops....3.80

Extras for Cutting to Length all Preceding Iron.
All Iron, including Tire....1.10c

Tank Iron.
No. 9 and heavier....3.30
Plow Slabs....3.30
" Wings....3.50

Sheet Iron.

	Common.	Charcoal.	Juniata.
Nos. 10 to 14	[illegible]	[illegible]	[illegible]
Nos. 15 to 17	[illegible]	[illegible]	[illegible]
Nos. 18 to 20	[illegible]	[illegible]	[illegible]
Nos. 21 to 24	[illegible]	[illegible]	[illegible]
Nos. 25 & 26	[illegible]	[illegible]	[illegible]
No. 27	[illegible]	[illegible]	[illegible]
No. 28	[illegible]	[illegible]	[illegible]

All sheets No. 16 and lighter, over 30 inches wide, not less than 2.10c extra.

Wood's Patent Planished Sheet.
1st quality (A)....12c | 2d quality (B)....10½c

Galvanized Iron—Juniata.
Nos. 14 to 20....[illegible] | No. 27....[illegible]
Nos. 21 to 24....[illegible] | No. 28....[illegible]
Nos. 25 and 26....[illegible] | No. 29....[illegible]
Current discount to jobbers, 1st quality, 27½ %; 2d quality, 37½ %.

Coal Screen Iron.
[illegible]....2.00 | [illegible]....3.50

Angle Iron.
[illegible]

T Rail.
8 lbs. to the yard....[illegible] | 20 lbs. to the yard....[illegible]
[illegible]

Splice Joints for 12, 16 and 20-lb. Rail, 40c each; 25 and 30-lb. Rail, 50c each; 40 lb., 60c each.
[illegible] Spikes for 20 and 25-lb. Rail....[illegible]
[illegible] 12 and 16-lb. Rail....[illegible]
[illegible] 8-lb. Rail....[illegible]

Flat Rails.—Punched and Countersunk.
[illegible]

Juniata Nail Rods....[illegible]
Norway....[illegible]
Guard Iron....[illegible]
Drag Bars....[illegible]
Dropper Bars....[illegible]
[illegible] Iron....[illegible]
Plow Slab Iron....[illegible]

Nails.
10d to 60d....$3.00

Best Quality Refined Cast Steel.

Square, Flat, Octagon and Round.
⅜ to 2 inches, inclusive....13 c
5-16 and 2⅛ to 3 inches....14 c
¼ and 3⅛ to 4 "....15 c
7-32 and 4⅛ to 5 "....16 c
3-16 and 5⅛ to 6 "....19 c
5-32 inch....23 c
⅛ inch....31 c
Oil Well Steel Forgings....21½c
No grade of Crucible Tool Steel shall be sold for less than above prices.

Machinery Steel.

	Crucible.	Bessemer & Open Hearth.
Ordinary Sizes, ⅜ to 2 inch Round	7½c	6c
5-16 and 2⅛ to 3 inches	8½c	7c
¼ and 3⅛ to 6 "	9½c	8c
7-32 inch	10½c	9c
3-16 "	12½c	11c

Square, Flat and Octagon, ½c extra throughout the list.
Cut to specified lengths, ½c extra.

Hammer Cast Steel.
2 inches and under....8½c
Above 2 inches....9½c

Sheet Steel.—Crucible.

	Best.	2d Qual.	3d Qual.	Bessemer & Open Hearth.
To 21 gauge	13c	11c	9c	6½c

1c. extra for each additional gauge.
Cut to multiples or specified lengths, ½c. extra.

Miscellaneous Cast Steel.
Auger and Auger Bit....8½c
Axle Steel for carriages and wagons....8½c
Frog Points and Plates....10c
" Side Bars....8c
Pick, plain....9c
" and Mattock, beveled....9c
Skate Steel....8½c
Table Cutlery....9c
Pike and Cant Hook....9c
Coal and Granite Wedge....9c
Roller....7½c
Spindle, subject to Machinery classification....8½c
Trap Spring Steel....9½c
Forged Crank Pins and Lathe Spindles....10½c
Piston Rods, plain....8c
" forged to shapes....10½c
Slide Bars, plain....8c
" forged to shapes....10½c

Crucible, Open Hearth or Bessemer.
Boiler, Fire-Box and Flue Sheets, not less than 3-16 thick....
Boiler, Fire-Box and Flue Sheets, not less than ⅛ thick....
Circulars and semi-circulars, when ordered separately....
Smoke Stack, to shape....
Locomotive Tank Steel....

File Cast Steel.
Square, Round, Half Round and Flat Bastard, 8-inch and over....9c
Mill Saw, 8-inch and over....9½c
Taper, 3½-inch and over....10½c
Horse and Shoe Rasp....9½c

Spring Cast Steel....7½c
Spiral and Taper, cut to lengths....8c

Tire Cast Steel.
1x¾ and over....8c
1x3-16, ⅞x3-16 and ¼....8½c
1 and 13-16x⅛ and 5-32, ¾x3-16 and 5-32....9c
¾ and ⅝x⅛ and 5-32 and 12 g....9½c
Solid Safe Cast Steel....7½c

Agricultural Implement Cast Steel.
Fork and Rake, Crucible....8½c
Horse Rake Steel, cut to lengths, Crucible....9 c
Hoe, Crucible....8 c
Corn Stalk Cutter, beveled....9 c
Beveled Hoe and Shovel Steel in Bars....9 c
Crucible Plow Steel in slabs....8½c

Bessemer and Open Hearth.
Spring....5½c
" spiral and taper, cut to lengths....6½c
Tire, 3-16 thick and above....5½c
Toe Calk....5½c
Plow....5½c
Axle Billets....5½c
Sleigh Shoe....5c
Cutter Shoe, cut to lengths and tapered....6½c
Scythe Back Steel....5c
Grain Drill Bars....8½c
" Points....9½c
Rolling Coulter Blanks, cut and punched....10½c
Thrasher Steel....5½c
" Teeth....6½c
Rolled Hammer Billets....5½c
Where Bessemer or Open-hearth Steel can be used in place of Crucible, the difference in price shall not be greater than 1c. per lb., except where especially provided in the list.
Terms.—Four months; 3 per cent. discount for cash, if remitted within 30 days.

Rolls and Castings.
Furnace, Floor and Straightening Plates....2½c
Housings and Castings not otherwise specified....3 c
Guide Plates....3½c
Spindles and coupling boxes....3 c
Sand Rolls and Pinions, large size....3 c
" " small size....3½c
Pipe Mill Castings....5 c
Rolling Mill Castings under 50 lbs....4 c
Spur and Bevel Wheels, large....3½c
" " small....4½c
Pulleys up to 30 inches....4½c
" over 30 inches....4½c
Engine Castings, light....4½c
" " heavy....4 c

Chilled Rolls.
6 to 7 in. diam., 7 to 20 in. long....6½c
8 to 15 in. " 8 to 40 in. "....6½c
25 to 24 in. " 15 to 72 in. "....5 c
14 to 31 in. " 72 to 108 in. "....5 c

White and Red Lead.
Strictly Pure White Lead in Oil, in kegs, in lots of 500 ℔ and over, 9c; less than 500 ℔, 9½c in 25 and 50 ℔ Tin Pails, ½c. ℔ ℔ over keg price; 12½ ℔ Tin Pails, 1c ℔ ℔ over keg price; assorted, 1 to 5 ℔, 100 ℔ Cases, 12c.
Dry White Lead..less than 500 lbs., 8½c; over 500 lbs. 8¼c
Orange Mineral, genuine, in kegs, 10c; in barrels, 9 c
Red Lead, very brilliant, " 8c; " 7½c
Litharge (Potter's Lead) " 8c; " 7½c
Freights equalized with all points.
Terms: Note at sixty days, or if paid within 15 days from date of invoice, a discount of 1½ per cent. will be allowed, but not otherwise.

Window Glass.
Per Box of 50 Feet.—Discount 50&10 % on single strength, 60&10 % on double.

Size.	AA.	A.	B.	C.
Single Strength.				
6 x 8 to 10 x 15	$8.25	$7.50	$7.00	$6.50
11 x 14 to 16 x 24	9.25	8.50	8.00	7.25
18 x 22 to 20 x 30	10.75	9.75	8.75	7.75
15 x 36 to 24 x 30	12.25	10.75	9.00	8.50
26 x 28 to 24 x 36	13.00	11.50	9.75	9.00
26 x 36 to 26 x 44	14.50	13.25	10.75	9.50
26 x 46 to 30 x 50	15.00	14.00	11.25	10.50
30 x 52 to 30 x 54	16.00	14.50	12.00	
30 x 56 to 34 x 56	17.25	15.50	13.50	
34 x 58 to 34 x 60	18.25	17.25	15.00	
36 x 60 to 40 x 60	20.75	18.75	17.25	
Double Strength.				
6 x 8 to 10 x 15	12.75	11.75	10.75	10.00
11 x 14 to 16 x 24	14.50	13.25	12.50	11.25
18 x 22 to 20 x 30	17.25	15.75	14.00	
15 x 36 to 24 x 30	19.75	17.25	14.50	
26 x 28 to 24 x 36	21.00	18.50	15.75	
26 x 36 to 26 x 44	[illegible]	[illegible]	[illegible]	
26 x 46 to 30 x 50	[illegible]	[illegible]	[illegible]	
30 x 52 to 30 x 54	[illegible]	[illegible]	[illegible]	
30 x 56 to 34 x 56	[illegible]	[illegible]	[illegible]	
34 x 58 to 34 x 60	[illegible]	[illegible]	[illegible]	
36 x 60 to 40 x 60	[illegible]	[illegible]	[illegible]	

An additional 10 per cent. will be charged for all glass more than 40 inches wide. All sizes above 52 inches in length and not making more than 50 united inches, will be charged in the 84 united inches bracket.

BOSTON.

Reported by Macomber, Bigelow & Dowse, 156 to 164 Oliver St.

Anvils.—"Eagle American"........₩ ℔ 9⅛c. dis 20 %
Apple Parers.
Reading "78"........per doz., $7.50
Reading "76"........per doz., 6.00
Reading "72"........per doz., 5.00
Goodell Turn Table........per doz., 5.50
Goodell Improved Turn Table........per doz., 7.50
Goodell Family Corer and Slicer........per doz., 7.00
Hudson's Improved "80"........per doz., 6.50
Goodell Lightning........per doz., 6.00
Aiken's Tools........dis 40&10 %
Anvil & Vise.—
No. 1, $5.25; 2, 4.25; 3, 3.50 each........dis 25 %
Augurs & Bitts.—Snell's Auger........dis 40 %
L'Hommedieu's Ship Augers........dis 15 %
Jenning's Bitts........dis 10&10&10 %
Cook's Bitts........dis 40&10 %
Sheparson's Double-Cut Bitts........dis 45 %
" " Gimlets........dis 40 %
Stearn's Extension Hollow Augers—
No. 2, ₩ doz, $48.00, No. 3, ₩ doz, $60.00 list, dis 20 %
Bonney's Extension Hollow Augers....₩ doz $36.00
Pierce's Bitts........dis 35 %
Griswold "........dis 40 %
Axes.—Blue Jackets........per doz 9.00
Red Cross........per doz 8.00
" Handled........per doz 12.00
Dowse " Boys'........dis 33⅓ %
Ax Handles.—
Oak Extra, 31 in., No. A........₩ doz $2.00
" 34 in., No. A........₩ doz 2.25
" 31 in., No. B........₩ doz 1.50
" 34 in., No. B........₩ doz 1.75
" 31 or 34 in., No. C........₩ doz 1.15
Axle Clips........dis 10 %
Balances.—Chatillon's........dis 15&10 %
Barn Door Rail.—
Cast Angle (for Anti-Friction Hangers)....per ft. 3c
" Half-Round........per ft, ⅝, 5c ¾, 6½c
Wrought "........per ft, ½, 4c; ⅝, 5c; ¾, 6c
Bells.—Connel's Crank Gong reduced list..dis 20&10 %
Bird Cages.
Japanned M. B. & D., reduced list, 1879........dis 40 %
Brass " " 1879........dis 33⅓ %
Blind Fasts.—Lock Fasts........₩ C sets $6.00
No. 6 Fasts........₩ C sets 6.50
Veazie Fasts........₩ C sets 6.50
Shedd's........₩ C sets 7.00
Blind Hinges.—Mall. Hook, 3 holes....₩ C sets 8.50
Brad Awl Handles.—
Phœnix Adjustable........₩ doz $2.00
Bolts.—Norway Iron Carriage........dis 70&5 %
Common "........dis 80&5 %
Borax.—Refined........₩ ℔ 1.20
Boring Machines.
Eagle Upright each,........$5.50 list } dis 40 %
Eagle Angle each,........6.75 list }
Snell Augers........₩ set 4.70
Braces.—Barber's........dis 40 %
Spofford's........dis 50 %
Backus'........dis 50 & 10 %
Bracket Saws.—Holly Scroll Saw........each, $2.50
Demas Lathe and Scroll Saw........" 6.50
Bracket Saws, extra quality, to No. 5......₩ gro $0.75
Steel Frame, with patterns........₩ doz 6.50
Lester........dis 20 %
New Rogers, all iron........dis 25 %
Bracket Saw Blades.
Griffith's patent........₩ gross 75c
Brackets.—H. B. & M. Flower Pot reduced list—
........dis 25&10 %
Bronzed Shelf, M. B. & D. new list........dis 50 %
Store Shelf........dis 40 %
Bronze Hardware.—
Butts.—Union Fast Joint........dis 40&10 %
Loose "........dis 50&10 %
" Japanned Acorn........dis 55&10 %
" Silvered "........dis 55&10 %
" Boston Finish........dis 75&10 %
Union Spiral Spring........dis 25&10 %
Wrought Brass........dis 45 %
Carriage Bolts.—Eagle Norway........dis 70&5 %
Common........dis 80&5 %
Carriage Jacks.
"Climax" No. 1........₩ doz $20.00
" No. 1½........" 15.00
" No. 2........" 13.50
"Universal"........dis 25 %
" No. 1........each, $2.00
" No. 2........" 3.00
" No. 3........" 6.00
" No. 4........" 6.00
" No. 5........" 6.50
Cartridges.—U. S. Cartridge Co........dis 60&10 %
Cards.—Watson's make Horse and Curry........dis 10 %
" Cotton........dis 10 %
" Wool........dis 10 %
Casters.—Bed and Table........dis 25&10 %
Chain.—Traces 6½, 10, 4, streight........₩ pair 45c
" 6½, 10, 4, twisted........₩ pair 50c
" 7, 12, 2, "........₩ pair 75c
Coil 3-16........₩ ℔ 11 c
" ¼........₩ ℔ 8½c
" 5-16........₩ ℔ 8 c
" ⅜........₩ ℔ 7 c
" 7-16........₩ ℔ 6½c
" ½........₩ ℔ 6½c
Chalk.—White, Carpenter's........₩ gross 60c
Red, Carpenter's........₩ gross 80c
Blue. "........₩ gross $1.00
Chisels.—Hart, Bliven & Mead, Framing dis 60&10&10 %
Underhill, Framing........dis 20 %
Buck's Chisels........dis 30 %
Clothes Line.—
Galvanized Wire, 100 feet each........₩ doz $4.50
Coal Hods.—"Dover."—Galvanized, new list..dis 50 %
Japanned, new list........dis 50 %
Coffee Mills.—New list........dis 35 %
Copper Rivets........dis 35 %
Cow Ties........dis 33⅓ %
No. 30, 3 ft. No. 6 Wire, with toggle........₩ doz $3.00
No. 35, 3 ft. " " with snap........₩ doz 3.80
No. 40, 3½ ft. " " with toggle........₩ doz 3.90
No. 45, 3½ ft. " " with snap........₩ doz 4.10
No. 50, 4 ft. No. 4 " with toggle........₩ doz 4.50
No. 55, 4 ft. " " with snap........₩ doz 4.75
No. 60, 4½ ft. " 3 " with toggle........₩ doz 5.38
No. 65, 4½ ft. " " with snap........₩ doz 5.63

Cocks.—Brass, L. F. & C........dis 40 %
Cordage.—Manila, usual trade dis 10........₩ ℔ 13c
Jute........₩ ℔ 9c
Crow-Bars. Cast Steel........₩ ℔ 3½
Iron Steel Pointed........₩ ℔ 5c
Cutlery.—Pocket, American Shear Co.'s........dis 40 %
Butcher Knives, "Woods," Lap Bolster.
Square Handle........dis 20 %
Steak Knives........dis 10
Lap Bolster, Oval Handle........dis 10
Sticking........dis 20 %
Skinning........dis 20 %
Butcher, Common Round Handle, "Woods"...dis 20 %
Shoe Knives, "Woods"........dis 10 %
Dividers.—Cook's........dis 25 %
Dog Collars........dis 20 %
Dog Muzzles.—Automatic........dis 15 %
Door Springs.—Torrey's Rod........₩ doz $2.00
Imitation Torrey's Rod........₩ doz $1.75
Gem Coil........dis 10 %
Crown........₩ doz $1.25
Warners........₩ doz $2.00
Door Stops.—"Thurston's"........dis 45 %
Drawer Knobs.—"Thurston's"........dis 45 %
Drills.—Morse Bitt Stock........dis 25 %
Morse Straight Shank........dis 20 %
Emery.—Wellington Mills........₩ ℔ 10c
The Alden Emery Co........₩ ℔ 6c
Turkish in 10 ℔ cans........₩ ℔ 8c
Enamelled Ware.
Standard Mfg. Co. Kettles........dis 40&10 %
" Sauce Pans........dis 25 %
Felloe Plates.—Wrought........₩ ℔ 9c
Files.
American File Co........dis 30 %
Nicholson "........dis 30 %
Fluting Machines.
Knox list, $1.00........dis 10 %
American list, $3.40........dis 10 %
Forks. W. C. & Co., Manure........dis 40 %
Gimlet Bitts.
Genuine German, No. 125, 1-32 to 8-32, per doz $1.00
Pierce's........per doz 68c
Glass Cutters.
Combination Glass Cutter and Knife Sharpener........₩ doz $1.00
Grub Hoes.—K. P. & Co.'s No. 2, 11.50 ₩ doz..dis 30 %
Hammers.—Maydole's........dis 15 %
Hammond's........(new list.)........dis 20 %
Hangers & Rollers.—Anti-Friction........dis 50&10 %
Acme Rollers........dis 50 %
Climax........dis 50 %
Common Hangers........dis 30&10 %
" Rollers........dis 35&10 %
Hand Screws........dis 10 %
Hatchets.—C. F. Dowse new list........dis 33⅓ %
Underhill........dis 25 %
Hay Knives.—Lightning........₩ doz $18.00 net
Fisher's Patent........₩ doz @14.00
Hinges.—Strap and T (new list)........dis 45&10 %
Providence Plate........₩ ℔ 5c
Wrought Screw Hook........₩ ℔ 5c
Hoes.—W. C. & Co.'s........dis 40 %
Hooks and Staples.—Brewers'........dis 40 %
Horse Nails. No. 6 7 8 9
National Finished........ .23 .21 .20 .19....dis 20 %
Putnam Pointed........ .26 .24 .23 .22........10 %
Horse Nails.—Bridgewater........dis 25
No. 6 23; No. 7, 21; No. 8, 20; No. 9, 19.
Ice Cream Freezers.—"Packer's"........dis 40
Knobs.—"Norwalk." New list........dis 50 %
Silver Glass........dis 50&10 %
" Bell Pulls........dis 50&10 %
Lanterns.—Guarded No. 99........₩ doz 7.50
Tubulars, No. 0........₩ doz 8.00
Railroad, Oil, No. 43........₩ doz 9.00
Triangular........₩ doz 4.00
Hurricane........dis 20 %
Lead.—Sheet........₩ ℔ 7 c
Pipe........₩ ℔ 6½c
Locks.—Norwalk Genuine Bronze Goods........dis 30 %
Eagle Cabinet........dis 10 %
" Trunk........list net
W. Wilcox & Co., Padlocks........dis 40 %
American Lock Co.'s Steel Key........dis 33⅓ %
Manure Forks.—W. C. & Co........dis 40 %
Mattocks.—K. P. & Co., Long Cutter, 10.00 ₩ doz.
........dis 30 %
K. P. & Co., Short Cutter, 14.40 ₩ doz........dis 30 %
" Pick " 16.00 ₩ doz........dis 30 %
Measuring Tapes.—Eddy's........dis 20 %
Meat Cutters.—Miles' Challenge........dis 30 %
Hale's, (New list)........dis 40 %
American........dis 25 %
Money Drawers.—Tucker's Alarm........₩ doz $22.50
Mouse Traps.—Delusion........₩ doz 2.00
Novelty........₩ doz 1.75
Nails........₩ keg. 3.15 rates
Oilers.—Zinc and Tin........dis 45 %
Brass and Copper........dis 33⅓ %
Ox Bows.—Extra finished and varnished........list net
1⅝ in., ₩ doz. pair..$5.75 | 2 in., ₩ doz. pair....$9.00
1¾ in., " " .. 8.00 | 2⅛ " "....11.00
Padlocks.—W. Wilcox & Co.'s........dis 40 %
Paper.—Tarred Sheathing........₩ ℔ 2¾c
Dry Sheathing........₩ ℔ 2¾c
Picks.—K. P. & Co., Adze Eye, 5 to 6 ℔ 12.00....dis 30 %
" " 6 to 7 ℔ 13.00....dis 30 %
Planes.—Greenfield Tool Co........dis 25 %
N. Y. Tool Co........dis 30 %
English Iron........dis 20 %
Bailey's........dis 20&10 %
Plated Ware.—Rogers & Bro........dis 33⅓&5 %
Pliers.—Vom Cleff & Co.'s........net list
Button's Wire Pliers........dis 33⅓ %
Plumb & Levels.—Stanley, R. & L. Co..dis 60&10 %
Pocket Knives.
American Shear Co.'s........dis 33⅓&10 %
Potato Diggers.—W. C. & Co. reduced list...dis 40 %
Pulleys.
Acme or Excelsior, 1¾ in........per doz 230
" " 2 in........" 260
Pulley Blocks........dis 40 %
Pumps.—Union Manufacturing Co.
Iron Cistern........dis 35 %
" Pitcher Spout........dis 35 %
Copper........dis 30 %
Rivets.—Black........dis 50 %
Carriage in 10 ℔ papers........dis 30 %
Copper........dis 35 %
Razors.—Torrey's........dis 10 %
Razor Strops.—Torrey's........Full line.
Rules.—Stanley........Boxwood, dis 60&10 %
"........Ivory, dis 40&10 %
Sadirons.—Common........₩ ℔ 3½c
Laundry........₩ ℔ 6½c
Tailor's Geese........₩ ℔ 6c
Enterprise, "Potts'"........dis 30 %
Sash Locks.—King & Hutchinson's, new list..dis 40 %
Sandpaper.—Baeder & Adamson........dis 25 %
M. B. & D........dis 25&5 %
Sash Weights.—Patent Eye........₩ ℔ 1⅜c
Saws.—Hand Saws, Disston's........dis 20 %
Wheeler & Clemson........dis 20 %
Cross-Cut Saws.
W. M. & C., Common Tooth, No. 1........₩ foot 35c
" Champion "........₩ foot 35c
Disston's, Common "........₩ foot 40c
" Gt. American "........₩ foot 40c
Boynton's Lightning "........₩ foot 45c
M. B. & D., Hand Saws........dis 25 %
W. M. & Co.'s. Circular Saws........dis 35 %
Richardson Bros........dis 25 %
Saw Blades.—Disston........dis 25 %
W. M. & C........dis 15 %
Welch & Griffith, Extra........₩ doz $8.40
" " No. 2........₩ doz 7.00
Scales.—Fairbanks........dis 20 %
Screws.—Aiken's Flat-Head Iron........dis 45 %
American Flat Head Iron........dis 45 %
" " Brass........dis 45 %
" Round-Head "........dis 30 %
" " Iron........dis 40 %
Grilley " Nickel-plated Common..dis 50 %
Scythes.—Clippers, in boxes........₩ doz $9.00
Shaves.—Kimball's........₩ inch 7½c
Watrous........dis 15 %
Shears.—American Shear Co., new list........dis 70 %
Shot.—Tatham's........₩ ℔ 7½c
Shovels.—O. Ames, new list........dis 10 %
O. Ames, other brands, new list........dis 10 %
M. B. & D........dis 10 %
Oxford Birmingham Pattern........dis 45 %
Sinks.—Magee Patent........dis 30 %
Snow Shovels.—Malleable tips........
Skates.—Union........dis 25 %
Acme........dis 20 %
Stock and Dies.—King's........dis 10&5 %
Tacks.—A. Field & Son's........dis 20&10 %
Pittsfield........dis 20&10 %
Swedes Tinned........35&10 %
Swedes Iron........20&10 %
Gimp and Lace........20&10 %
Copper Tacks........25&10 %
All balances on list........15&10 %
Traps.—Oneida, Genuine........dis 33⅓ %
Oneida, Imitation, H. & N........dis 50 %
Blake's........dis 40 & 10 %
Vises.—Simpson's Adjustable........dis 25&5 %
Howard Vise Co........dis 25 %
Prentiss'........dis 20 %
Weather Strips.—Packer's........₩ doz $4.50
Browne's Flexible Rubber........dis 33⅓ %
In 25 feet boxes; No. 1, ½ in. wide, ₩ yard 10c.; No. 2, ⅝ in., 15c. No. 3, ¾ in., 20c.; No. 4, 1 in., 25c
Black Walnut Spring Weather Strips....₩ doz. $3.50
Window Springs........dis 20 %
Babcock's No. 3........₩ gross $6.25
" " 4........₩ gross 4.15
Wire Cloth.—"Clinton"........₩ ft. 3½c
Wire Fence.
Scutt's Patent, Painted........₩ ℔ 7½c
" Galvanized........₩ ℔ 8½c
Wire Goods.—Gate Hooks and Eyes, &c., new list........dis 60&10 %
Wrenches.—A. G. Coe's........dis 50 %
Girard Mfg. Co........dis 50&10 %
Girard Agl........dis 60 %
Wringers.—Universal No........₩ doz $63.00
Universal, No. 2½........₩ doz 60.00
Novelty, No. 10........₩ doz 60.00
" No. 2........₩ doz 63.00
" No. 22........₩ doz 67.00
Excelsior, No. A........₩ doz 75.00
" No. B........₩ doz 83.00
" No. CC........₩ doz 105.00
Novelty Set Tub, E........₩ doz 66.00
Eureka........₩ doz 48.00
Keystone, Wood Frame No. 1½........₩ doz 51.00
" Iron Frame No. 2½........₩ doz 51.00
Zinc........₩ ℔ 7½c
Withington, Cooley & Co.—Hoes, Rakes, Forks &c dis 40 %. Special rate for Export.

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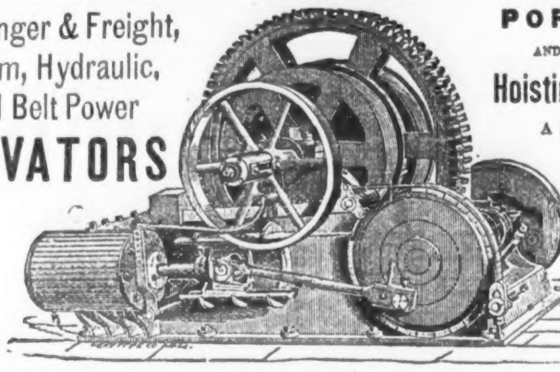

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TACKLE BLOCKS & SHEAVES,
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Very Strong and durable for ICE HOISTING, &C.
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MAGIC PLATE FOR PIPE.

No. 1 threads and cuts off 1/4 to 3/4
No. 2 " " " 1/4 to 1 1/4
No. 3 " " " 1/2 to 2
No. 4 " " " 1 1/2 to 3
No. 5 " " " 2 1/2 to 4
Size A threads bolts 1/4 to 3/4
Size B " " 1/4 to 1

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MACHINES
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COMPRISING
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WOOD-WORKING MACHINERY IN ALL ITS BRANCHES. PORTABLE ENGINES. UPRIGHT and HORIZONTAL STATIONARY ENGINES, 1 TO 300 HORSE POWER. LOCOMOTIVE FIRE-BOX, HORIZONTAL, and UPRIGHT BOILERS, 1 TO 100 HORSE POWER. WATER WHEELS, COTTON AND WOOLEN MACHINERY, STEAM PUMPS, GRISTMILL MACHINERY, Etc., FULLY DESCRIBED, AND PRICES ANNEXED,

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Sole Agents in adjacent states for
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Watchman's TIME DETECTORS at $40.00 to $75.00,
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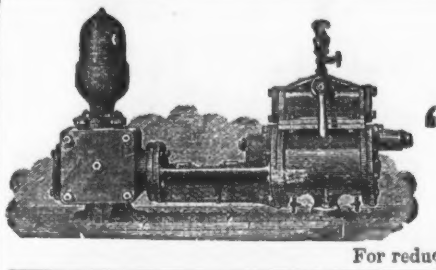

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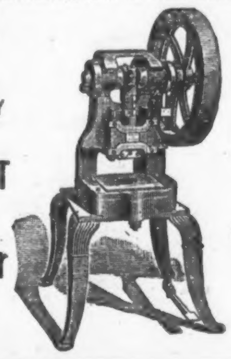

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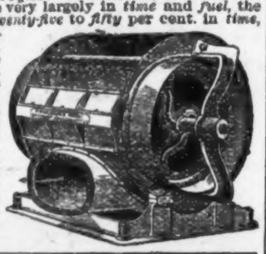

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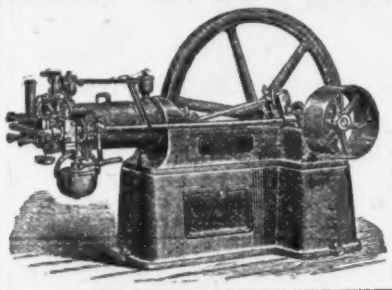

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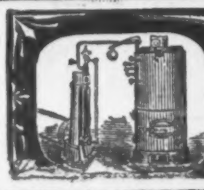

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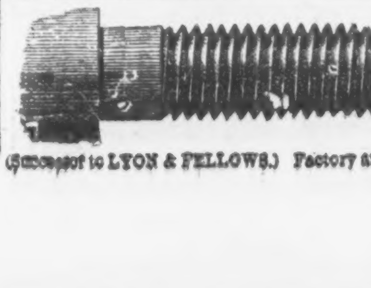

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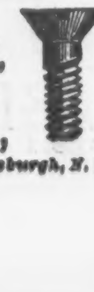

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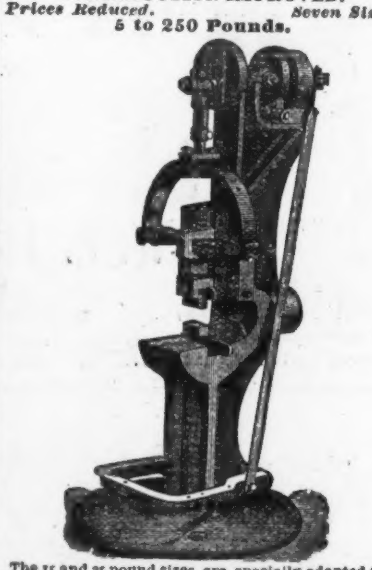

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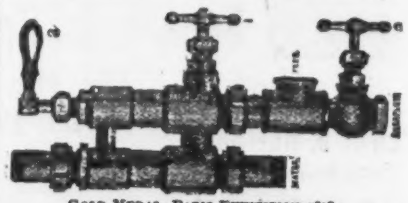

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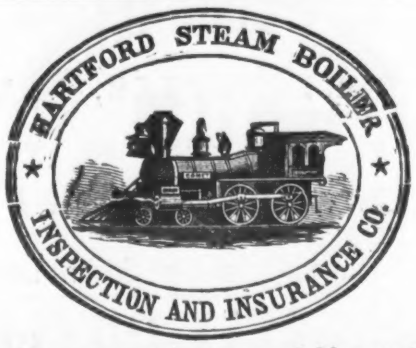

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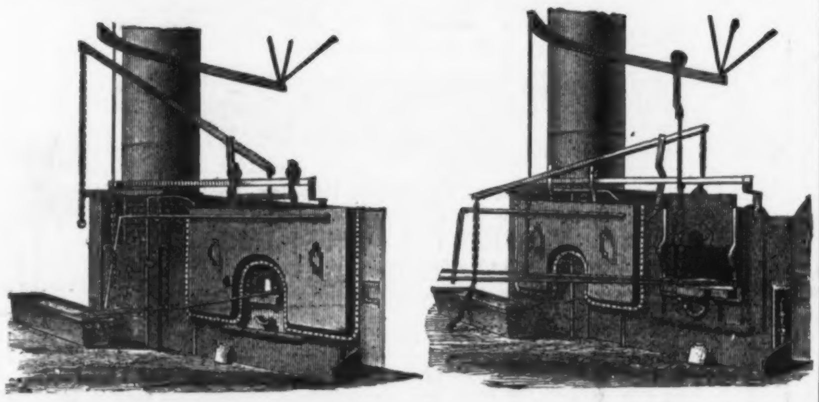

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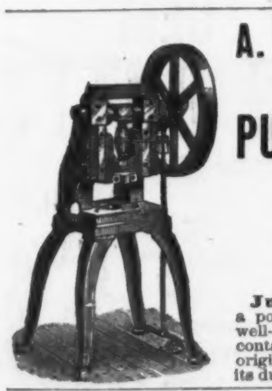

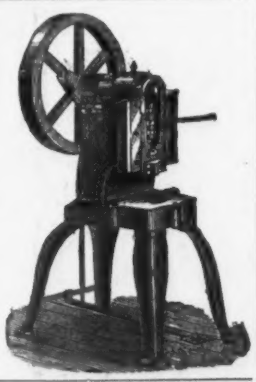

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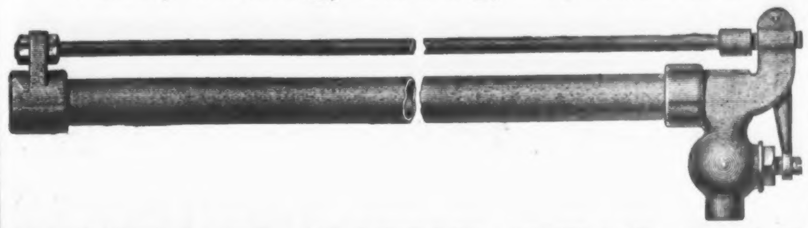

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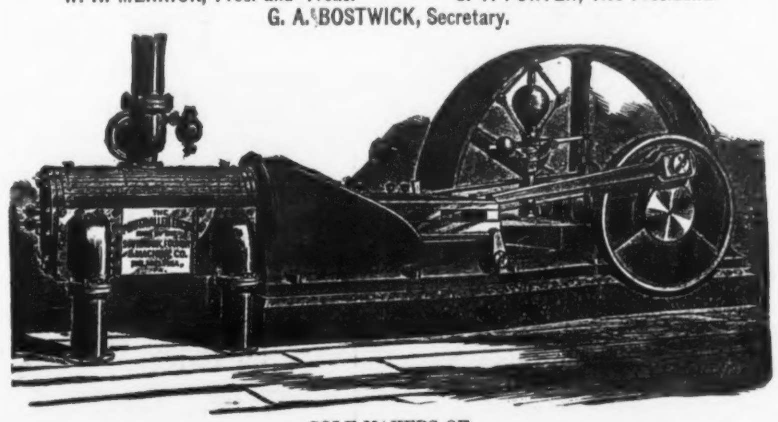

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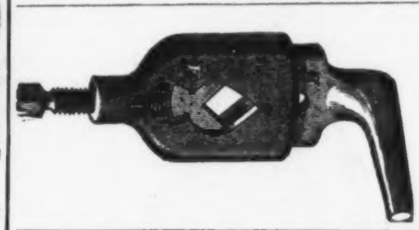

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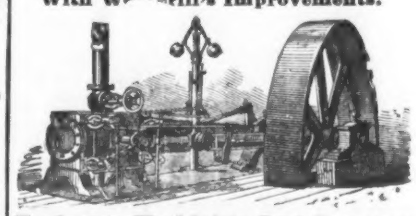

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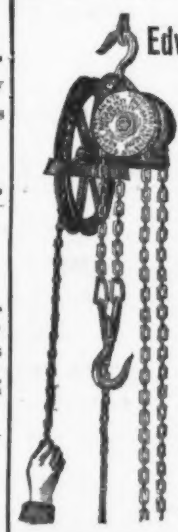

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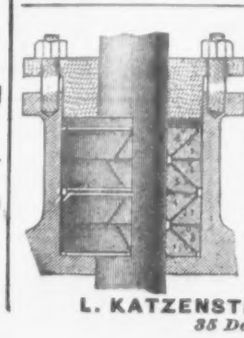

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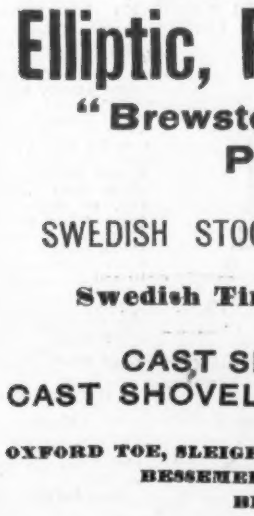

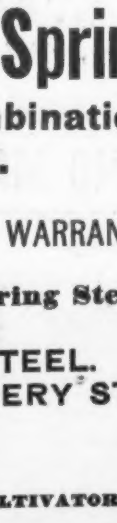

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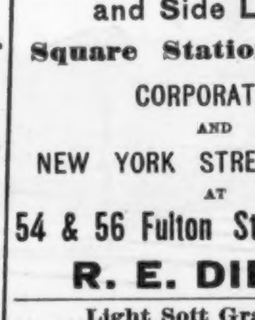

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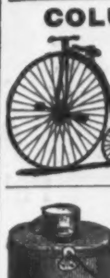

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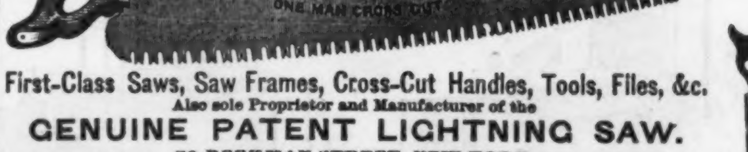

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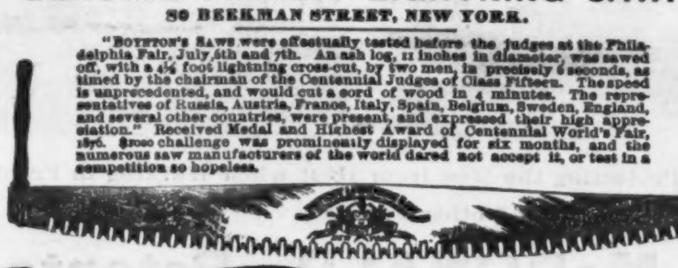

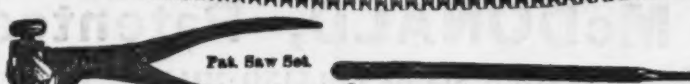

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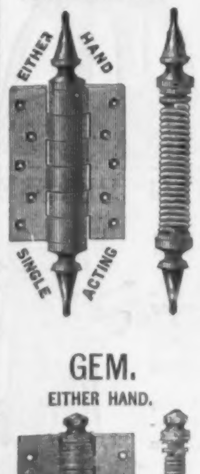

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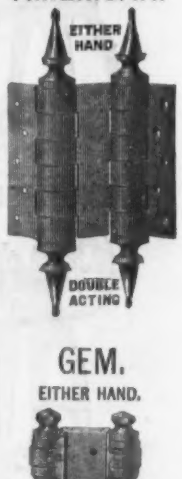

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